CONSEIL PERMANENT INTERNATIONAL POUR
L'EXPLORATION DE LA MER

RAPPORTS

ET

PROCÈS-VERBAUX DES RÉUNIONS

VOLUME XXXIV

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DIX-SEPTIÈME RÉUNION

COPENHAGUE — SEPTEMBRE 1924.

BUREAU DU CONSEIL:

M. H. G. Maurice, Président du Conseil.
M. Otto Pettersson, Vice-Président du Conseil.
M. J. Hjort, Vice-Président du Conseil.
M. T. Tissier, Vice-Président du Conseil.
M. F. Drechsel, Secrétaire-Général du Conseil.

MEMBRES DU CONSEIL ET EXPERTS

et leurs adresses:

Belgique: M. G. Gilson, Professeur, Directeur du Musée Royal d'histoire naturelle de Belgique, *Bruxelles.*

M. A. Hamman, Président du Comité de Mariculture, Membre du Parlement Belge, Rue longue 60, *Ostende.*

Danemark: M. le Commandeur C. F. Drechsel, Strandvej 34, *Copenhague.*

M. Martin Knudsen, Professeur à l'Université, Polyteknisk Læreanstalt, *Copenhague.*

Experts: M. le Dr. A. C. Johansen, Strandvej 34, *Copenhague.*

M. F. V. Mortensen, Directeur des Pêches, Vestmannagade 1, *Copenhague.*

M. le Dr. Johs. Schmidt, Directeur du Laboratoire Carlsberg, Section de Physiologie, *Valby, Copenhague.*

Espagne: M. le Professeur Odón de Buen, La Gasca 116, *Madrid.*

M. le Professeur José Giral Pereira, Chef de Chimie dans l'Institut espagnol d'Océanographie, *Madrid.*

Esthonie: M. le Consul Général d'Esthonie à Copenhague Harry Jacobsen, Upsalagade 16, *Copenhague.*

Finlande: M. le Dr. R. Witting, Professeur, Directeur de l'Institut finlandais pour l'Exploration de la Mer (ou Directeur de "Merentutkimuslaitos"), *Helsingfors.*

M. le Dr. T. H. Järvi, Professeur, Directeur de l'Institut scientifique des Pêches, *Helsingfors.*

France: M. Théodore Tissier, Président de section au Conseil d'État, Président du Conseil d'Administration de l'Office Scientifique et Technique des Pêches Maritimes, 13, rue Monsieur, *Paris.* Suppléé en cas d'empêchement, par M. le professeur Joubin, membre de l'Institut, Directeur de l'Office Scientifique et Technique des Pêches Maritimes.

M. George Lecourbe, Directeur du Service des Pêches Maritimes et du personnel Central au Sous-Secrétariat d'État des Ports de la Marine Marchande et des Pêches, 24, rue du Boccador, *Paris.*

Experts: M. le professeur L. Joubin, membre de l'Institut, Directeur de l'Office Scientifique et Technique des Pêches Maritimes, Délégué suppléant, 55, rue du Buffon, *Paris.*

M. Ed. le Danois, Docteur ès-sciences, Sous-Directeur de l'Office Scientifique et Technique des Pêches Maritimes, Secrétaire de la délégation, 3, avenue Octave Gréard, *Paris.*

Grande Bretagne: Mr. H. G. Maurice, C. B., Fisheries Secretary, 43, Parliament Street, *London.*

Professor D'Arcy W. Thompson, C. B., F. R. S., The University, *St. Andrews.*

Experts: Mr. J. O. Borley, O. B. E., Fisheries Laboratory, *Lowestoft.*

Mr. A. Bowman, D. Sc., F. R. S. E., Fishery Board Laboratory, *Aberdeen.*

Mr. J. N. Carruthers, Fisheries Laboratory, *Lowestoft.*

Mr. R. S. Clark, M.A., B.Sc., Fishery Board Laboratory, *Aberdeen.*

Mr. T. Edser, 43, Parliament Street, *London.*

Mr. David T. Jones, C. B. E., F. R. S. E., Chairman of the Fishery Board for Scotland, *Edinburgh.*

Mr. D. J. Matthews, *London.*

Lettonie: Mr. W. Miezis, Ministère d'Agriculture, *Riga.*

Norvège: M. le Professeur Johan Hjort, à l'Université, *Christiania.*

*M. Einar Lea, Fiskerikonsulent, *Bergen.*

* N'a pas assisté à la réunion de Copenhague.

Pays-Bas: M. le Dr. E. VAN EVERDINGEN, Professeur à l'Université, Directeur en Chef de l'Institut Météorologique Royal des Pays-Bas, *De Bilt.*
M. le Dr. H. C. REDEKE, Directeur du "Rijksinstituut voor Biologisch Visscherijonderzoek", *Helder.*

Portugal: *M. le Colonel F. A. CHAVES, Directeur du Service Météorologique des Açores, *Ponta Delgada, Açores.*
M. l'Admiral A. E. NEUPARTH, Intendance de la Marine, *Lisbonne.*
Expert: M. le Dr. A. RAMALHO, Aquario Vasco da Gama, *Dafundo (Lisbonne).*

Suède: M. le Dr. O. PETTERSSON, Professeur, *Holma, Gåseberg, Bohuslän.*
M. le Dr. GUSTAF EKMAN, Södra Hamargatan 11, *Göteborg.*
Experts: M. le Dr. K. A. ANDERSSON, Directeur des Pêches Maritimes, Kungl. Lantbruksstyrelsen, *Stockholm.*
M. le Dr. HANS PETTERSSON, Docent, *Göteborg.*

Invités :

État Libre d'Irlande Mr. G. P. FARRAN, Inspector of Fisheries, Irish Free State, 3, Kildare Place, *Dublin.*

États-Unis: Lieutenant EDW. H. SMITH, United States coastguard, *Massachussets.*

Pologne: M. MICHEL SIEDLECKI, Professeur de Zoologie de l'Université de *Cracovie.*

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* N'a pas assisté à la réunion de Copenhague.

AGENDA

for the seventeenth meeting of the International Council for the Exploration of the Sea, September 1924,

(Copenhagen, 11th—15th September 1924.)

1. Opening of the Proceedings, by the President.
2. Report by the General Secretary as to the present participation.
3. Administrative Report.
4. Final approval of the Accounts for 1922—23.
5. Statement of Accounts for 1923—24.
6. Estimates for the financial year 1924—25.
7. Formation of Sections and Committees (Hydrographical, Plankton, Statistical, Limnological, and Committees dealing with the Plaice, Herring, Cod and Haddock, Baltic, Atlantic Slope and North Western Atlantic investigations).
8. Hydrographical programme and Hydrographical Bulletin. *)
9. Communication about the International Expedition proposed.
10. Reports and proposals of the Sections and Committees.
11. Nomination of the members of the Bureau, the Editorial Committee, and the Editors and Conveners.
12. Other business.
13. Conclusion of the meeting.

*) In a letter to the Bureau about this question the President writes: — "What I do regard as essential is to carry our hydrographical studies further — to make a very definite advance — and to that end I think we need to have a serious hydrographical conference at which we shall consider what point we have reached, what is the end in view and what is the best way to reach that end. I think that conference should take place either at, or, more privately, after the Council meeting and should be preceded in all countries by a careful and serious stocktaking, by which I mean that the hydrographers of each country should consider what is the present condition of hydrographical knowledge and endeavour to form a considered judgement as to the future of it, which judgement they will bring with them to a conference".

REPORT

of

the 17th Meeting of the Council.

Plenary Meetings of the Council were held in Copenhagen on September 11th and 15th.

The Committees on Plaice, Herring, Atlantic Slope, North Atlantic, Baltic, Statistics, Hydrography, Limnology, Cod and Haddock held meetings from the 11th to the 13th of September.

First Sitting: Thursday, September 11th 1924, at 11 a. m.

The President, Mr. MAURICE, in the chair.
Present: the members, experts etc. (vide list p. 5 to 7).

Under **Point 1** of the agenda the President formally opened the proceedings in the following words:—

Messieurs,

La dix-septième session du Conseil International pour l'Exploration de la Mer est ouverte.

L'année passée nous nous sommes réunis sur l'invitation du Gouvernement de la République française à Paris, où nous avons été accueillis avec l'hospitalité et la bienveillance auxquelles peuvent toujours s'attendre en France ceux qui s'occupent de travaux scientifiques et pratiques.

Aujourd'hui nous nous trouvons réunis, comme d'ordinaire, en Danemark, qu'on pourrait nommer le berceau du Conseil International pour l'Exploration de la Mer, et je vous propose de présenter, par télégramme, selon notre coutume, nos hommages à Sa Majesté le Roi de Danemark, qui a été depuis si longtemps notre hôte intéressé et bienveillant.

Messieurs, nous voyons ici aujourd'hui des nouveaux venus: M. le professeur ODÓN DE BUEN, M. le professeur GIRAL PEREIRA, délégués de l'Espagne, j'ai l'honneur de vous exprimer, au nom du Conseil, la grande satisfaction que nous éprouvons de l'adhésion au Conseil du Gouvernement de sa Majesté le Roi d'Espagne. Nous vous saluons, et nous nous félicitons de ce que votre Gouvernement a bien voulu

se faire représenter par des délégués si distingués. Nous espérons que vous rapporterez à votre Gouvernement un bon rapport sur les travaux que nous poursuivons ensemble.

Nous souhaitons aussi la bienvenue à M. MIEZIS, Délégué de la Lettonie, à M. JACOBSEN, Représentant de l'Esthonie, à M. le Professeur SIEDLECKI, qui, à titre de visiteur, représente la Pologne, et à M. le Capitaine de vaisseau SMITH qui représente de même les États-Unis d'Amérique. J'espère qu'ils se convaincront que le Conseil International pour l'Exploration de la Mer travaille le plus efficacement possible à l'étude scientifique et pratique des problèmes de pêcherie, et que seule la coopération internationale permet d'espérer la solution définitive de ces problèmes si complexes, si difficiles et en même temps si importants pour le monde entier.

J'ai le plaisir de vous présenter des nouveaux experts Britanniques, Mr. MATTHEWS, Mr. CARRUTHERS et Mr. CLARK. Je vous présente aussi M. le capitaine de vaisseau TWIGG que notre Amirauté a envoyé ici avec le croiseur de surveillance "Godetia" pour montrer le grand intérêt qu'elle prend à nos délibérations et à nos travaux.

Permettez-moi d'ajouter un mot sur le nouveau bureau où nous siégeons à cette occasion. Vous pourrez juger si il a été bien choisi, et je constate que quoiqu'il nous coûte plus que le dernier, nous avons ici à très bon marché, vu les frais d'aujourd'hui, toutes les facilités nécessaires pour des travaux effectifs et permanents. Vous trouverez ici, non seulement une demeure convenable, mais aussi, par la gracieuse hospitalité du Gouvernement danois, le déjeuner quotidien qui vous débarassera de la nécessité de chercher autre part vos repas et de perdre ainsi le temps que vous voulez mettre aux travaux qui sont le motif de notre coopération.

Enfin, Messieurs, je vous prie, quoique je sache bien que ce n'est pas nécessaire, de donner, comme toujours, au Conseil vos meilleurs efforts et de coopérer ensemble à la poursuite de nos buts scientifiques et surtout pratiques.

Point 2 of the Agenda (Report as to the present participation).

The General Secretary said:

Since the end of the war, the participation in the Council has never been so well settled as now.

As reported at the last meeting of the Council, 9 countries were then participators, viz:—

Belgium,
Denmark,
Finland,
France,
Great Britain,
Norway,
the Netherlands,
Portugal,
Sweden.

To these has been added, during the past year, Latvia, participating temporarily on the condition of free membership and at liberty to contribute something, if it should so desire, and according to its means.

In accordance herewith the Latvian Government has for the financial year 1923—24 contributed 2000 Kroner.

Esthonia has applied for temporary membership, on the same conditions as Latvia, which has been approved by all participating countries. At this meeting of the Council the Esthonian Government has been represented by its General Consul in Copenhagen, H. Jacobsen.

As to the Irish Free State, the following communication has been received from the Danish Foreign Office:—

"Pour faire suite à ma note du 14 août dr. concernant l'attitude prise par divers Gouvernements participant au Conseil International pour l'Exploration de la Mer vis-à-vis de la demande d'adhésion de l'Etat libre d'Irlande, j'ai l'honneur de vous communiquer que les Gouvernements Français et Belge ont informé les Légations Royales à Paris et à Bruxelles qu'ils n'ont aucune objection à formuler contre l'adhésion de l'Irlande au Conseil.

Le Gouvernement Français a ajouté qu'il suppose que l'accession de l'Irlande est appuyée par le Gouvernement Britannique.

Je ne manquerai pas de vous faire part des points de vue adoptés à ce sujet par les Gouvernements Britannique, Finlandais, Néerlandais et Suédois dès que j'en aurai été informé".

The participating countries have agreed to the reduction of the Belgian contribution to 5000 Kroner as a temporary measure.

Spain. The Danish Foreign Office has communicated to the Bureau as follows:—

"Conformément aux instructions de son Gouvernement la Légation d'Espagne à Copenhague m'a informé par une note en date du 30 août dr. que le Gouvernement Espagnol a accordé l'adhésion de l'Espagne au Conseil International pour l'Exploration de la Mer, pour un temps indéfini. Par conséquence l'Espagne accepte le Règlement du Conseil et en sa qualité de membre est disposé à payer la contribution annuelle de 25000 couronnes danoises. En outre le Gouvernement Espagnol a nommé Président de la Délégation Espagnole et Membre permanent du Conseil International Monsieur le Docteur Don Odón de Buen, Professeur de l'Université Centrale et Directeur Général de la Pêche. Monsieur de Buen désignera un ou deux délégués qui assisteront avec lui aux réunions du Conseil.

Vu qu'au cours de l'année de 1920 tous les Gouvernements dont se composait alors le Conseil, c. à d. les Gouvernements Danois, Belge, Britannique, Finlandais, Français, Néerlandais, Norvégien et Suédois ont donné à l'unanimité leur consentement à l'adhésion de l'Espagne au Conseil, le Ministère des Affaires Étrangères est d'avis que la note de la Légation d'Espagne n'exige qu'une simple communication aux Gouvernements faisant actuellement partie du Conseil".

Monsieur le Professeur Odón de Buen a communiqué au Bureau que le délégué d'Espagne qui assistera aux réunions du Conseil avec lui est Monsieur le

Professeur GIRAL PEREIRA (José), Chef de Chimie dans l'Institut Espagnol d'Océanographic.

With regard to Russia nothing has occurred. Russia is at present of slight importance to the Council, and only for Baltic investigations. Elaborate Russian investigations are, however, said to be in progress in the White Sea off the Murman coast, and in the Caspian and Black Seas.

As is well known, a meeting of Experts in the Plaice question has been suggested, and to this meeting all Governments concerned with the question have been invited. The German Legation has now informed the Danish Foreign Office that their investigations of the North Sea plaice question are to be finished to January next. An official conference on the Plaice question should be convened at a later date during the winter months.

From Poland the answer has been received that the Polish Foreign Office has proposed to accept with thanks the invitation of the Council to participate, but owing to a desire in various quarters to enter as an active and paying member of the Council, no definite decision has as yet been taken.

On the 25th August, however, the Bureau received the following letter from the Danish Foreign Office:—

> "Suivant un rapport reçu de la Légation royale à Varsovie j'ai l'honneur de vous communiquer que le Ministère polonais des Affaires Etrangères a informé, par une note du 16 courant, ladite Légation que le Gouvernement polonais vient de désigner M. MICHEL SIEDLECKI, Professeur de zoologie de l'Université de Cracovie, en qualité de son Délégué provisoire au Conseil International pour l'Exploration de la Mer".

All questions here referred to have been approved by the participating countries.

A note from the British Legation at Copenhagen has informed the Danish Foreign Office about the arrival at Copenhagen of the British man-of-war, the "Godetia", from the 11th to the 18th September on the occasion of the meeting of the International Council. The Foreign Office has acknowledged receipt of this communication and has added that the Danish Government will be pleased to see the "Godetia" at Copenhagen.

Point 3 of the Agenda (Administrative Report).

The General Secretary gave a short résumé of the administrative report.

Point 4 of the Agenda (Final approval of the accounts for 1922—23).

These accounts for 1922—23 are now submitted to the Council for its final approval. They have been audited and found correct by the Finance Committee, viz. the President, Professor KNUDSEN, le directeur LE COURBE, Professor VAN EVERDINGEN and Monsieur HAMMAN. Do any of the delegates wish to examine these accounts before voting? If not, they may now be considered approved by the Council.

Point 5 of the Agenda (Statement of Accounts for the financial year 1923—24).

Generally the Statement of Accounts is printed and laid before the members of the Council at the first sitting of the annual meeting. This has not been possible at the present meeting, because the accounts for the past financial year cannot be terminated before some items of the expenditure have been discussed at a Bureau meeting. I therefore beg leave to lay the Statement of Accounts before the Council at a later sitting.

Point 6 of the Agenda (Estimates for the financial year 1924—25).

As the Statement of Accounts has not been finished the Estimates were suggested to be dealt with at a later meeting.

Point 7 of the Agenda (Formation of Sections and Committees).

The President suggested on the behalf of the Bureau that the following Sections and Committees should be formed and that the first sitting of each Committee should be opened by the following gentlemen:

Herring	Committee.....	Mr. D. T. Jones.
Plankton	—	Prof. Pettersson.
Hydrographical	—	
Limnological	—	Dr. Redeke.
Statistical	—	The General Secretary.
Atlantic Slope	—	M. Joubin.
Cod & Haddock	—	Dr. Bowman.
Plaice	—	Dr. Redeke.
North Atlantic	—	- Schmidt.
Baltic	—	- Witting.

The meeting was then adjourned.

Second Sitting: Monday, September 15th, 1924, at 3,30 p. m.

The President, Mr. Maurice, in the chair.
Present: the members. experts, etc. (vide list p. 5 to 7).

The President opened the meeting and stated that in accordance with the decision of the first sitting of the Council the following telegram had been sent to His Majesty the King of Denmark:—

A Sa Majesté le Roi de Danemark, Skagen.

Les membres du Conseil International pour l'Exploration de la Mer réunis à Copenhague demanendt la permission de témoigner à votre Majesté leurs sentiments les plus respectueux.

Maurice, Président, Merexploration, Copenhague.

In reply to this the following telegram had been received from the King:—.

Mes remerciments sincères et mes meilleurs voeux pour le Conseil.

CHRISTIAN R.

Point 5 of the Agenda (Statement of accounts for 1923—24).

The General Secretary referred to the printed statement of Accounts for the financial year 1923—24, distributed to the members. The items of the expenditures were on the whole in accordance with the estimates. In Head II item 7—11 there was a saving owing to the fact that the late Hydrographical Assistant, Dr. GEHRKE, had not been replaced. The Travelling Expenses too showed a saving of about 2000 Kr. The Balance to carry forward was Kr. 134,480,45.

Point 6 of the Agenda (Estimates for the financial year 1924—25).

Referring to the increased income of the Council and to certain increases of expenditures proposed in the Budget, the President said the Bureau wanted to point out that the Budget was valid for one year only, and that these increases did not, therefore, involve any permanent liability. The point was important because, although the Council, owing to the adhesion of new countries had, for the present, a large income, it must be remembered that 1926 would be the end of the period of five years for which the countries represented in 1920 had agreed to participate. Two questions would then arise:— 1) whether all the countries now represented would continue to adhere to the Council, and 2) whether any change is to be made in the rates of contribution. The first alteration in the Estimates is under Head I item 2, the General Secretary's salary. This is raised from 12,000 to 15,000. There are now 12 countries instead of 9, and the General Secretary's work has therefore greatly increased. The President had no doubt that every member of the Council would agree to this proposal; he pointed out that the 15,000 Kr. was very little more than was paid to the General Secretary's predecessor before the war. Item 6 under Incidental expenses, Editor for Plankton, had been altered from 3,000 to 2,000 Kr. This was suggested by the Editor, Prof. OSTENFELD, himself, as the Plankton work was inconsiderable at present. The salaries for 2nd Assistant Secretary, Miss HANSEN, and the statistical Assistants, Captain SCHØNING and Miss HANSTED, have been raised by 500 Kr. each.

Travelling expenses have been raised by 2000 Kr., partly because the Bureau had proposed that the General Secretary should attend the meeting of "Union Géodésique et Géophysique Internationale" in Madrid in October next, and also because other extra travelling expenses were likely to occur during the coming year.

The Bureau proposed to divide the item formerly appearing as "Special Resolutions" into two so that the estimate for Conveners might appear separately. It was felt by the Bureau that the Council should agree upon a total sum to be spent on Conveners, and should decide from year to year between which conveners the sum should be allotted taking into account always the exigencies of the work

the various conveners were called upon to perform. Under Special Resolutions was a sum of 1000 Kr. to Dr. JOHANSEN who is the Bureau's only biological Assistant, 1000 Kr. to Dr. NORDQUIST for his work on the salmon, which had been printed as a "Rapport", 1000 Kr. to Mrs. GEHRKE as agreed to during the meeting in Paris (see Rapport & Procès Verb. XXXII Pag. 17), 3000 Kr. to Norway for the Herring investigations, and a sum intended to cover the expenses of the new hydrographical Sub-Committee and other expenses arising out of decisions of the Council.

After hearing the President's explanations the Council approved the estimates in the form in which they appear on page 18.

Point 8 of the Agenda (Hydrographical programme and Hydrographical Bulletin).

Professor PETTERSSON moved the appointment of a special hydrographical Sub-Committee to advise the Council as to future hydrographical work, and as to the future of the hydrographical Bulletin. The Council approved the appointment of a Sub-Committee to consist of:—

Professor O. PETTERSSON, chairman.
— JOHAN HJORT,
— E. VAN EVERDINGEN,
Dr. ALLEN,
Professor M. KNUDSEN,
Mr. C. F. DRECHSEL,
M. ED. LE DANOIS,
Dr. R. WITTING, secretary,
Professor D'ARCY W. THOMPSON.

The date of the meeting of this Committee would be decided by the Bureau.

Point 9 of the Agenda (Communication about the International Expedition proposed).

The General Secretary directed the attention of the Council to a circular, of which copies had been distributed, with reference to the suggested International Expedition, and asked members to let him have their observations thereon.

Point 10 of the Agenda (Reports and proposals of the Sections and Committees).

The President laid the reports and resolutions of the Committees before the Council.

The programmes were agreed to as printed on pp. 20—32.

The principal points of discussion on the reports were the following:—

Hydrographical Section. With regard to item III it was pointed out that this proposal did not clash with the reference to the special hydrographical Sub-Committee because the publication of a hydrographical Bulletin for 1924 was intended necessary to preserve the continuity of the work pending a decision as to the future.

In connection with the proposal that the surface observations taken in the Channel should be included in the Bulletin Dr. LE DANOIS remarked that these

observations could have been included in the Report on the Atlantic Slope, but that he had been instructed by the Editorial Committee that he was not to insert this material. It was agreed that this subject should be discussed by the Editorial Committee, and that the lines "if the observations are not being published in the Rapport Atlantique" should be added.

Comité du Plateau Atlantique. In connection with this programme Dr. LE DANOIS intimated that it was most important to France to have the observations asked for under Head 10, and Dr. REDEKE urged the importance of continuing the oil research (Item 11).

Plaice Committee. In connection with this report some discussion arose as to the constitution of the Committee of Experts and the place of meeting. It was agreed that the Experts would be nominated by the countries concerned, and that the arrangements would have to be made through the diplomatic channels, as it was not a Committee of the Council. The President said:— The Bureau propose to suggest to the Danish Foreign Office that the Experts should meet in Amsterdam as suggested by Dr. REDEKE. This appeared to be appreciated, as Dr. REDEKE had for so long been Chairman of the Council's Plaice Committee. Dr. REDEKE expressed the hope that the President would preside over the deliberations of the Expert Committee, and the President expressed his willingness to do so, if matters could be so arranged.

Point 11 of the Agenda (Nomination of members).

According to suggestion of the President the following elections were made and agreed upon:—

As Editors:—

Prof. D'ARCY W. THOMPSON for Statistics,
— MARTIN KNUDSEN - Hydrography,
— OSTENFELD - Plankton.

Editorial Committee:—

Prof. O. PETTERSSON,
— D'ARCY W. THOMPSON,
— G. GILSON,
— MARTIN KNUDSEN,
The General Secretary.

Finance Committee:—

The President,
Prof. WITTING,
Dr. REDEKE,
Admiral NEUPARTH,
Prof. GILSON.

Conveners:—

Mr. BORLEY for Plaice question,
Dr. LE DANOIS for Atlantic Slope question,
Dr. JOHS. SCHMIDT for North Atlantic question.

Professor D'Arcy Thompson proposed that the Members of the Bureau be reelected. (Applause).

The President thanked the Council for this renewal of their confidence in the Bureau.

Point 12 of the Agenda (Other business).

Professor Pettersson proposed the following resolution:—

"The Council considers it desirable that constant interchange of information should take place between the Discovery Committee of the British Colonial Office, the Norwegian expedition of Dr. Hjort, and the Ice Patrols of the United States and of Canada, as to the hydrographic and biological investigations pursued by them in Polar waters, in order that the work may be carried out on parallel lines. The Council requests Dr. Hjort to place himself in communication with the Discovery Committee and the Ice Patrol of the U.S.A. and Canada for this purpose".

Le Danois, as the representative of France on the North Atlantic American Fisheries Committee, offered any assistance that he could give.

It was agreed to that the next Council meeting would be held in Copenhagen in August or September 1925, and that time for this meeting would be given later by the Bureau.

At the conclusion of the meeting Président Tissier proposed to thank the General Secretary for his excellent arrangements for the meeting which was passed by an acclamation.

In returning that, the General Secretary said that whatever he had been able to accomplish had been largely due to the support he received from his colleagues of the Bureau and the Council.

The President proposed a vote of thanks to the staff of the Bureau for their excellent work in connection with the meeting and with the work of the Council generally. The vote was heartily accorded.

The President finally expressed the sincere thanks of the Council to the Danish Commission for their hospitality.

The meeting then terminated.

On the 14th September Professor Pettersson read a paper: „Mouvements internes dans la mer et dans l'atmosphère."

ESTIMATE

of

the International Council for the Study of the Sea for the financial year 1924—25

Receipts:

Head	No.	Items	Kroner	Kroner
I	1	**Cash balance** on the 21st July 1924		134 480 45
II		**Annual contributions** of the Governments for 1924—25:		
	2	Belgium	5 000	
	3	Great Britain	25 000	
	4	Denmark	10 000	
	5	Finland	5 000	
	6	France	25 000	
	7	Netherlands	10 000	
	8	Norway	10 000	
	9	Portugal	5 000	
	10	Sweden	10 000	
	11	Latvia	2 000	
	12	Spain	25 000	
	13	Esthonia		
			132 000	132 000
		Total Receipts...		266 480 45

Expenditures:

Head	No.	Items	Kroner	Kroner
I		**Incidental Expenses:**		
	1	President	3 600	
	2	General Secretary	15 000	
	3	Chairman of Editorial Committee	2 000	
	4	Editor for Hydrography	3 000	
	5	Editor for Statistics	2 000	
	6	Editor for Plankton	2 000	27 600
II		**Assistance:**		
	7	1st Assistant Secretary	5 000	
	8	2nd » »	4 500	
	9	Hydrographical Department	5 750	
	10	Statistical Department	9 000	
	11	Plankton Department	1 500	25 750
III	12	**Expenses of the Office in Copenhagen:** Rent, service, heating, stationery, books, light, gas, telephone, telegrams, postage, freights, typewriting, minor expenses of meetings and other expenses	14 000	14 000
IV	13	**Travelling Expenses** of the administrative Staff	9 000	9 000
V	14	**Conveners**	9 000	9 000
VI	15	**Special Resolutions** of the Council	11 000	11 000
VII	16	**Printing and distribution**	25 000	25 000
			121 350	121 350
V III	17	**Extraordinary Expenses**	800	800
			122 150	122 150

Remarks to Estimate (1924—25).

Expenditures:

Head V & VI No. 14 & 15. Special resolutions of the Council divided in 2 items, one for Conveners: 9000 Kr. (Mr. Borley, Dr. le Danois and Dr. Schmidt 3000 Kr. each) and one for Special Resolutions of the Council (3000 Kr. to Norway for herring investigations, 1000 Kr. to Mrs. Gehrke, 1000 Kr. to Dr. Johansen, 1000 Kr. to Dr. Nordquist and 5000 Kr. to the Hydrographical Committee).

Head VII No. 16. Raised by 5000 Kr.

Programmes of Committees and Sections adopted by the Council.

Programme of the Herring Committee.

The chairman, in his opening remarks, referred to the importance of Herring investigations to countries bordering on the North Sea and to the fact that a special committee had been appointed to deal with the subject. He paid the highest compliment to the work already carried out by Dr. Einar Lea, the convener, work which showed characteristic thoroughness and originality. Dr. Lea had also shown that he desired complete and hearty co-operation with other workers. The Chairman made sympathetic reference to the illness of Dr. Lea and voiced the feeling of the committee in hoping for a speedy recovery and his return to the deliberations of the committee. In the circumstances Dr. Hjort was asked to give a summary of the work which had been accomplished since the last meeting.

Dr. Hjort read a communication from Dr. Lea on the work carried out concerning international herring investigation. Copies of the paper "Frequency Curves in Herring Investigation" were circulated. This paper gives further observations dealing with the possibility of arriving at the individual growth history of Herring by means of measurements on the scales and suggests that all countries interested in Herring investigations might undertake a similar investigation with regard to the possibilities of growth as has been done in Norway.

A further paper, shortly to be published, as a result of a visit to Christiania by Mr. Hodgson (England) and Mr. Wood (Scotland) deals with independent readings of the same scales and shows that the readings are essentially in agreement and comparable when made by trained observers.

Dr. Hjort stated that he was sorry that the work could not be completed before coming to this meeting, owing to the illness of Dr. Lea and he appealed to the Committee to recommend to the Bureau that payment be continued for this work. Accordingly the following recommendation was put forward:—

Programmes des Comités & Sections adoptés par le Conseil.

Programme du Comité du Hareng.

Le Président dans son allocution d'ouverture rappelle l'importance de l'étude du Hareng pour les Pays riverains de la Mer du Nord ainsi que le fait de la nomination d'un comité spécial. Il rend hommage au Dr. Einar Lea, le convocateur, dont le travail, dans sa partie terminée, présente un caractère très personnel et approfondi ce qui ne l'empêche pas d'exprimer le désir d'agir en complète et cordiale coopération avec les autres travailleurs. Le Président exprime sa sympathie au sujet de la maladie du Dr. Lea et se fait l'interprète des sentiments de l'assemblée en formulant l'espoir de sa rapide guérison et de sa rentrée prochaine au sein du Comité. Dans ces circonstances il est demandé au Dr. Hjort de donner un exposé sommaire du travail accompli depuis la dernière réunion.

Le Dr. Hjort lit une communication du Dr. Lea sur le travail exécuté par l'investigation internationale sur le Hareng. Des exemplaires de son travail intitulé "Courbes de fréquence dans l'étude du Hareng" sont distribués. Cette publication fournit de nouvelles remarques au sujet de la possibilité d'arriver à faire l'histoire du développement individuel du Hareng par la mesure des écailles et suggère l'idée de demander à tous les Pays intéressés à l'étude du Hareng d'entreprendre une investigation tendant à déterminer les conditions de la croissance, analogue à celle qui a été faite en Norvège.

Un autre travail qui sera publié prochainement comme résultat de la visite faite à Christiania par Mr. Hodgson (Angleterre) et par Mr. Wood (Ecosse) traite des lectures d'écailles faites indépendamment par plusieurs personnes et montre que les lectures portant sur les mêmes écailles sont essentiellement d'accord et comparables lorsqu'elles sont faites par des observateurs bien entraînés. —

Le Dr. Hjort déclare regretter vivement que le rapport n'ait pu être achevé avant sa remise par suite de la maladie du Dr. Lea et prie le Comité de demander au Bureau que la rémunération affectée à ce travail soit continuée. En conséquence, la recommandation suivante est formulée:

"That the committee recommend that investigations now being carried out in Norway under the supervision of Dr. Einar Lea be continued and that the Council, as suggested by Dr. Hjort, should continue the annual contribution of 3000 Kroner for the purpose, on the understanding that the papers showing the results already achieved are completed and published in due course."

The proposal to adopt Dr. Hjort's recommendation was put to the meeting and carried unanimously.

The programme of work as outlined in previous papers was approved.

Programme of the Hydrographical Section.

1) The programme outlined in 1922 (Rapp. et Proc. Verb. Vol. XXVIII) is recommended for continuation with certain changes to be introduced as a result of the progress of research: for instance the collection of water samples on the English lightvessels to be carried out every fourth day instead of daily, and the saving attained to be allotted to the institution of a new Atlantic Route.

   The intensive observations on currents to be no longer obligatory, it is suggested that they be replaced by measurements of the residual currents over periods of several days. (Similar changes to apply to the Danish and Dutch programmes).
2) Experiments to be carried out by England with drift indicating instruments.

3) A Bulletin Hydrographique containing the material for 1924 to be published on the same lines as for the preceding four years, and to contain also the English Channel surface observations of temperatures and salinities, if these observations are not published in the report of the Committee of the Atlantic Slope.
4) The committee proposes that a Publication de Circonstance be allotted to the English Department for the publication of outstanding war-time hydrographical data.

Programme of the Limnological Committee.

The Committee reaffirms the programme as laid down for 1923—24 (Proc. Verb. XXXII p. 24) and notes that, in addition, investigations will be carried out by Poland on the Salmon of the Vistula and by Finland on *Coregonus lavaretus* in the sea.

"Le Comité recommande que les investigations poursuivies en ce moment en Norvège sous la direction du Dr. Einar Lea soient continuées et que, suivant la proposition du Dr. Hjort, le Conseil renouvelle la rémunération de 3000 couronnes qui y est affectée, à la condition que les publications exposant les résultats déjà obtenus soient complétées et imprimées en temps opportun".

La proposition d'adopter la recommandation du Dr. Hjort est faite à l'assemblée et votée à l'unanimité.

Le programme de travail établi dans les publications précédentes est approuvé.

Programme de la Section Hydrographique.

1) La continuation du programme élaboré en 1922 (Rapports et Procès-verbaux, Volume XXVIII) est recommandée avec certains changements à y introduire comme résultats du progrès des recherches. Par exemple le prélèvement d'échantillons d'eau à bord des bateaux-phares anglais, ne devra plus se faire que tous les quatre jours au lieu de tous les jours et l'épargne ainsi réalisée devra être attribuée à la constitution d'une nouvelle "Route Atlantique".

   L'observation intensive des courants ne sera plus obligatoire; il est suggéré de les remplacer par des mensurations des courants résiduels sur des périodes de plusieurs jours. (Des changements semblables s'appliqueraient aux programmes Danois et Hollandais).
2) Des expériences seront faites par l'Angleterre avec des instruments renseignant sur la dérive.
3) Un Bulletin hydrographique comprenant les matériaux de 1924 sera publié sur les mêmes bases que celui des quatre années précédentes; il comprendra aussi les observations sur la température et la salinité de surface dans la Manche si ces observations ne sont pas publiées dans le rapport du Comité du Plateau continental atlantique.
4) Le Comité propose qu'une "Publication de circonstance" soit accordée au département anglais pour la publication des données hydrographiques non rentrées pendant la période de guerre.

Programme du Comité Limnologique.

Le Comité confirme le programme tel qu'il a été élaboré pour 1923—1924 (Procès-verbaux, Vol. XXXII p. 24) et note qu'en outre des investigations seront faites par la Pologne sur le saumon de la Vistule et par la Finlande sur le *Coregonus lavaretus*, en mer.

Programme of the Statistical Committee.

The Statistical Bulletin for 1919—20 was approved by the Committee, and it was agreed that the next Bulletin be issued on the same lines as heretofore. Attention was again called to the delay on the part of certain countries in the publication of their Statistics. M. Lecourbe reported, on behalf of the French authorities that the French statistics for 1921 were now in the press, that those for 1922 would follow in about three months, and those for 1923 in the beginning of the year 1925. With regard to Norway the Committee is informed that the publication has been delayed by strikes, but that the Statistics up to 1923 will be published this year, and subsequent statistics will be published annually in the year after that to which they refer.

The Committee further resolved to recommend to the Bureau the earlier publication of certain special statistics (e. g. those relating to Plaice), when such information is desired by other Committees dealing therewith.

The Committee approved of the proceedings of the Sub-Committee appointed at Paris, to deal with the delimitation of Fishery Regions: and recommended to the Bureau the publication of an official Chart on the lines laid down by that Sub-Committee, and already partially adopted in a Chart issued by the French authorities.

Programme of the Atlantic Slope Committee.

The Committee expects:

1) That the Free State of Ireland will continue to carry out hydrographical observations along 8° W. long. and complete them as far as possible by researches about the isohaline line of 35,50 $^{0}/_{00}$;
2) That France will continue to carry out researches on the Atlantic slope in the offing of the entrance of the Channel and in the Bay of Biscay;
3) That France and Great Britain will continue to carry out observations in the Channel;
4) That Spain will carry out hydrographical sections on the north coast, from Cape Peñas to Cape Finisterre;
5) That Portugal will continue to carry out researches on the West coast and extend them as far as the Azores and Madeira;
6) That Spain and Portugal will conclude an agreement for combined researches in the Spanish Bight;
7) That the investigations of the Committee be extended as far southwards as to reach the region of Madeira, Cape Verde Islands and the Azores;
8) That the investigations about Gibraltar be carried out in concordance with those of the Mediterranean Commission;

Programme du Comité Statistique.

Le Bulletin statistique pour 1919—20 est approuvé par le Comité et il est convenu que le Bulletin suivant sera rédigé sur le même plan que précédemment. L'attention est attirée une nouvelle fois sur le retard apporté par certains pays dans la publication de leurs statistiques. M. Lecourbe signale à l'égard des Autorités françaises que les statistiques françaises pour 1921 sont dès à présent sous presse, que celle de 1922 suivront dans environ trois mois et celles de 1923 au début de l'année 1925. Pour ce qui concerne la Norvège il est porté à la connaissance du Comité que la publication a été retardée par des grèves mais que la statistique jusqu'à 1923 sera publiée cette année ci et que les suivantes le seront annuellement pour l'année suivant celle à laquelle elles ont trait.

Le Comité décide ensuite de recommander au Bureau la publication rapide de certaines statistiques spéciales (par exemple celles qui ont trait à la Plie) quand pareille information est désirée par d'autres comités s'en occupant.

Le Comité approuve les rapports du Sous-comité nommé à Paris, pour traiter de la délimitation des régions de pêche et recommande au Bureau la publication d'une carte officielle sur les bases proposées par ce Sous-comité et déjà adoptées partiellement dans une carte publiée par les Autorités françaises.

Programme du Comité du Plateau Continental Atlantique.

Le Comité compte:

1) que l'État libre d'Irlande continuera ses observations hydrographiques le long du 8° W. et les complète autant que possible par des recherches autour de la ligne isohaline de 35,50 $^{0}/_{00}$,
2) que la France continuera ses recherches sur le plateau continental au large de l'entrée de la Manche et dans le Golfe de Gascogne,
3) que la France et la Grande Bretagne continueront leurs observations dans la Manche,
4) que l'Espagne exécutera des sections hydrographiques sur la côte nord du Cap Peñas au Cap Finisterre,
5) que le Portugal continuera ses recherches sur la côte ouest et les étendra jusqu'aux Açores et Madère,
6) que l'Espagne et le Portugal feront un accord pour une étude combinée dans la baie d'Espagne,
7) que les recherches du Comité seront étendues vers le Sud et atteindront la région de Madère, des îles du Cap Vert et des Açores,
8) que les recherches avoisinant Gibraltar seront faites en accord avec celles de la commission de la Méditerranée,

9) That researches on the hake, the sardine, the tunny and the long finned tunny be carried out in concordance by the specialists of the different countries:
   a) Hake — M.M. Farran, Belloc, Bellon, Ramalho;
   b) Sardine — M.M. Farran, le Danois, Allen, F. de Buen, Ramalho;
   c) Long finned tunny — M.M. Belloc, Cuesta, Ramalho;
   d) Tunny — M.M. Belloc, Roule, Miranda, F. de Buen, Ramalho;
10) That the states adhering to the International Council would supply the Atlantic Slope Committee with informations as to the presence and character of the tunny in the North Sea and Norwegian Sea;
11) That the investigations on petroleum oil be carried on.

Programme of the Cod and Haddock Committee.

Statements regarding the work of the previous year were considered as read. In addition Dr. Johansen gave a short account of special observations he had made in the Skagerak in 1923 on the young stages of the cod. The question as to what extent spawning cod occur in the eastern North Sea in summer was considered as worthy of further investigation.

The Chairman gave a brief summary of the haddock work carried out by Scotland referring specially to the somewhat unique conditions in the North Sea last year with regard to the dominance of the 1923 and 1920 year classes and the comparative scarcity of representatives for 1921 and 1922, and stated that in view of these conditions Scotland would endeavour to ascertain as fully as possible the distribution of these rich year classes and their elimination from the stock in subsequent years.

Dr. Schmidt suggested that data from earlier years and fresh material from the Faroes and Iceland should be examined with a view to determining what relation exists between good and bad survival years for haddock brood in these separate areas.

To extend the observations on age-assessment of the stock and on the growth rate in different areas and regions Denmark will supply scale material from the Jutland coast, Sweden from the Skagerak, and Ireland from the Irish coast. France will also supply as far as possible material from the southern limits of the haddock distribution in the Atlantic for comparison. They will also provide information regarding the Newfoundland fisheries.

Dr. Redeke called attention to his work on the anchovy in Dutch waters whereby he had shown by the method of mathematical correlation that the fluctuations in the fishery depend on the temperature of the water during the previous summer.

9) que des études sur le merlu, la sardine, le germon, et le thon seront faites en accord par les spécialists des différentes contrées,
   a) merlu — MM. Farran, Belloc, Bellon, Ramalho,
   b) sardine — MM. Farran, le Danois, Allen, F. de Buen, Ramalho,
   c) germon — MM. Belloc, Cuesta, Ramalho,
   d) thon — MM. Belloc, Roule, Miranda, F. de Buen, Ramalho,
10) que les états adhérents au Conseil International voudront bien fournir au Comité du Plateau Continental Atlantique des renseignements sur la présence et la caractère du thon en mer du Nord et en mer de Norvège.
11) que les recherches sur l'huile seront continuées.

Programme du Comité du Cabillaud et de l'Églefin.

Les rapports concernant le travail de l'année précédente sont considérés comme lus. En outre le Dr. Johansen donne un court aperçu des observations spéciales qu'il a faites dans le Skagerak en 1923 sur les stades jeunes du Cabillaud. La question de savoir dans quelle mesure se fait la ponte dans l'Est de la Mer du Nord en été est considérée comme méritant des investigations ultérieures.

Le Président donne un aperçu sommaire du travail exécuté par l'Ecosse sur l'Eglefin, en faisant ressortir les conditions assez exceptionnelles qui ont règné dans la Mer du Nord l'année passée par suite de la prédominance des classes annuelles de 1923 et 1920 et de la rareté comparative des représentants des classes de 1921 et 1922. Il fait connaître que l'Ecosse, en égard à ces conditions, s'efforcera de déterminer avec toute la précision possible la distribution de ces riches classes annuelles et les conditions de leur élimination du stock pendant les années ultérieures.

Le Dr. Schmidt suggère que les données des années écoulées et les matériaux nouveaux fournis par Féroë et par l'Islande devraient être examinés en vue de déterminer la relation qui existe entre les années de bonne et de mauvaise survivance du fretin d'églefin dans ces deux régions séparément.

Pour développer les observations sur la répartition des âges dans le stock et sur la rapidité de la croissance dans ces régions et dans des aires diverses, le Danemark fournira du matériel-écailles, de la côte du Jutland, la Suède du matériel du Skagerak et l'Irlande du matériel de la côte irlandaise. La France fournira aussi autant que possible, pour comparaison, du matériel provenant de la limite méridionale de la distribution de l'églefin dans l'Atlantique. Ces Pays apporteront aussi des informations au sujet des pêcheries de Terre Neuve.

Le Dr. Redeke signale à l'attention du Comité son travail sur l'anchois des eaux hollandaises dans lequel il a montré par la méthode des corrélations mathématiques que les fluctuations des pêcheries dépendent de celles de la température de l'eau pendant l'été précédent.

Dr. JOHANSEN stated that a similar method had been employed in the case of the catch of silver eels etc. in Denmark.

The Committee were of opinion that it was desirable whenever possible to apply similar methods to the study of fluctuations in the catch of other species.

Dr. ANDERSSON gave a short account of the work done in Sweden on the witch (Pleuronectes cynoglossus). Photographs were exhibited showing that the otoliths when suitably prepared by grinding could be used for the purpose of age-determination.

The programme of the previous year was reaffirmed with the modifications specified above.

Programme of the Plaice Committee.

Mr. BORLEY distributed first proofs of a report on the English Plaice investigations in the North Sea during the years 1921—1923. He summarised the conclusions set out in a review of the present position, as to the proposals for the regulation of the plaice fishery; he referred particularly to the passages dealing with the natural fluctuations and to the effects of intense fishing; and also to the desirability of exploring the suggestion of an international minimal size of mesh for seines. The report was discussed, and it was agreed that enquiries as to the relation of the meshes of the seine, and the sizes of fish passing through them were desirable; but that no special recommendation on the subject was necessary in view of point IV of the recommendations of the Committee in 1921 to which the Committee still adheres.

Dr. JOHANSEN made a statement as to the Danish work during the last two years. These investigations dealt with the variation in growth rate in the Horns Reef area, and its relation to the density of the plaice population; and with the relation between the abundance of plaice of the first and later year groups. He drew the committee's attention to Dr. KRAMP's work on the abundance of plaice-eggs in the Belt sea.

The committee agreed the suggestions as to future work contained in Mr. BORLEY's report; and Dr. JOHANSEN stated that next year he hoped that Denmark could carry out the age determinations from Esbjerg included in these suggestions and make investigations as to the frequency of the 0-group in certain places on the west coast of Jutland. The committee expressed the view that it was most desirable to extend such investigations to other coasts.

Dr. REDEKE suggested the desirability of further investigation of the food of the early year groups, on which work had been carried out in Holland.

Le Dr. JOHANSEN dit qu'une méthode analogue a été appliquée à la pêche des anguilles argentées etc. en Danemark.

Le Comité est d'avis qu'il est désirable que des méthodes de ce genre soient appliquées, chaque fois que la chose est possible, à l'étude des fluctuations de la capture d'autres espèces.

Le Dr. ANDERSSON présente un rapport succinct sur le travail exécuté en Suède sur la plie cynoglosse (Pleuronectes cynoglossus). Des photographies exhibées montrent que les otolithes convenablement préparées par usure peuvent être employées pour la détermination de l'âge.

Le programme des années précédentes est confirmé, avec les modifications spécifiées ci-dessus.

Programme du Comité de la Plie.

Mr. BORLEY distribue les premières épreuves de son rapport sur les observations anglaises sur la plie dans la Mer du Nord pendant les années 1921—1923. Il résume les conclusions d'une révision de la situation actuelle en vue des propositions à faire pour la réglementation de la pêcherie de la plie. Il insiste particulièrement sur les passages traitant des fluctuations naturelles et sur les effets de la pêche intensive; il émet aussi l'avis qu'il est désirable que l'on examine la proposition qui a été faite d'imposer une dimension minimale internationale pour les mailles de la seine. Le rapport est discuté et il est reconnu qu'il est désirable que l'on soumette à des investigations la relation entre la dimension des mailles de la seine et celle des poissons qui peuvent les traverser; toutefois une recommandation spéciale de la question n'est pas jugée nécessaire étant donné la teneur du point IV des recommandations faites par le Comité en 1921 et auxquelles le Comité adhère encore.

Le Dr. JOHANSEN fait rapport sur le travail du Danemark pendant les deux dernières années. Ces investigations portent sur la variation de la rapidité de la croissance dans l'aire de Horns Reef et sur sa relation avec la densité de la population des plies ainsi que sur la relation entre l'abondance de la plie d'un an et celle des autres groupes annuels. Il attire l'attention sur le travail du Dr. KRAMP sur l'abondance des oeufs de plie dans les eaux des Belts.

Le Comité adopte les suggestions concernant le travail à accomplir qui sont contenues dans le rapport de Mr. BORLEY, et le Dr. JOHANSEN déclare qu'il espère que le Danemark pourrait mener à bien à Esbjerg les déterminations d'âge comprises dans ces suggestions. Il espère aussi pouvoir faire des recherches sur la fréquence du groupe 0 en certains points de la côte du Jutland. Le Comité exprime l'avis qu'il est très désirable que ces investigations soient étendues à d'autres côtes.

Le Dr. REDEKE émet l'avis qu'il est désirable que de nouvelles investigations sur la nourriture dans les premiers groupes annuels soient entreprises. Ce sujet a fait l'objet d'un travail en Hollande.

Programme of the North Atlantic Committee.

Denmark: 1. Marking Experiments with Cod at Iceland. — 2. Pelagic hauls during the spawning season of the Cod at Iceland, and at the Faroes. — 3. Continued hydrographical work at a fixed station in Faxe Bay, Iceland, to study the hydrographical conditions all the year round.

England: 1. Analyses of the size composition of catches by commercial trawlers at the Faroes and Iceland by fish-measurers. — 2. Collection of scale material from the Faroes and Iceland (under 1) for age-determination. — 3. Market measurements at Grimsby. — 4. Commercial statistics.

France: 1. Hydrographical sections at Iceland by French Cruiser. — 2. Hydrographical and Plankton work by Dr. Charcot ("Pourquoi-Pas") in summer at the Faroes, Rockall etc.

Norway: Programme to be arranged.

Scotland: 1. One cruise by Research Vessel to Iceland in June to keep the continuity of observations. — 2. Hydrographical cruises in Faroe Shetland Channel. — 3. Biological observations at Faroe and Faroe Banks. — 4. Comparative fishing experiments with the commercial otter trawl and with a 50 foot otter trawl used by the "Dana". — 5. Age-assessment of Haddock from Faroe and Iceland: a) Collections by fish-measurers. b) As ascertained from analysis of catches from Aberdeen market.

Programme du Comité de l'Atlantique Septentrional.

Danemark — 1. Expériences de marquage sur le cabillaud en Islande. — 2. Pêches pélagiques pendant la saison de la ponte du cabillaud en Islande et aux Féroë. — 3. Continuation du travail hydrographique à une station fixe dans la baie de Faxe, Islande, pour l'étude des conditions hydrographiques pendant toute l'année.

Angleterre. — 1. Analyse de la composition des captures par des mesureurs de poissons à bord des chalutiers commerciaux aux Féroë et en Islande. — 2. Réunion de matériel-écailles des Féroë et d'Islande (compris sous le n° 1) pour les déterminations d'âge. — 3. Mesurages de marché à Grimsby. — 4. Statistique commerciale.

France. — 1. Sections hydrographiques en Islande par le croiseur français. — 2. Travail hydrographique et planctonique par le Dr. Charcot („Pourquoi-pas") en été, aux Féroë, à Rockall etc.

Norvège. — Programme à arranger.

Ecosse. — 1. Une croisière par le navire de recherches en Islande en juin pour maintenir la continuité des observations. — 2. Croisières hydrographiques dans le Canal Féroë-Shetland. — 3. Observations biologiques aux Féroë et aux bancs de Féroë. — 4. Expériences comparatives de pêche avec le chalut à planches commercial et le chalut à planches de 50 pieds employé par le "Dana". —5. Evaluation d'âge de l'Eglefin des Féroë et d'Islande, a) par des prélèvements faits par les mesureurs de poissons, b) par l'analyse des captures sur le marché d'Aberdeen.

Programme of the Baltic Committee.

1) Detailed fishery statistics should be collected from all countries bordering on the Baltic according to a uniform scheme. The statistics should comprise (a) quantity and value of all food-fishes caught. (b) Number, value and size of fishing vessels, distinguishing between steamers, motor vessels and sailing vessels. (c) Number and kind of fishing gears, and (d) Number of men employed in the fisheries. It is considered important that the statistics should give information about the catch for each month of the year or even for still shorter periods.
2) Investigations should be made about the food-fishes in the Baltic, according to the following specified programme:

a) Investigations regarding the spawning areas of the cod by statement of the occurrence of cod eggs.
b) Investigations to decide whether the eggs in the various areas are developed into larvae.
c) Investigations regarding the occurrence of larval and post-larval stages of the cod and also regarding the occurrence of young cods.
d) Investigations regarding the rate of growth of the cod as well as its age, length and weight at first maturity.
e) Investigations regarding the food of the cod in the various stages of its development.
f) Investigations regarding the migration of the cod by marking experiments.
g) Investigations similar to those cited in a—f should be made also regarding the flounder, the plaice and the turbot, especially with the view of considering the adoption of legislative measures for prohibiting overfishing.
h) Investigations regarding the Baltic herring in selected places. These investigations should have the aim of stating the racial characters, the spawning seasons, the rate of growth and the frequencies of the different year-classes as well as the food of the Baltic herring. Special weight should be laid on investigating the influence of a deficit in the oxygen of the deep water on the herring.
i) Investigations similar to those stated in h) should be made on the Baltic sprat.

3) Simultaneously with the investigations mentioned in 2) the plankton and the hydrographical conditions are also to be investigated.
4) The hydrographical cruises in the Baltic should be continued.
5) Observations from lightships and from adequately situated points on the Baltic coasts should be made on temperature, salinity and currents in the surface and at different depths with a degree of frequency sufficiently high for following the hydrographical variations going on in the Baltic: The joint publication of monthly mean sea temperatures from past years in the Baltic and the Belts is considered most desirable.
6) Serial observations of the oxygen as well as temperature and salinity down to greater depths should be made from selected points say from Christiansø, Visby and from Märket and Utö. The joint publication of the material hitherto collected appears desirable.
7) Continuous observations of the sea temperature by means of recording thermometres should be attempted.
8) Preliminary investigations physical and biological of the bottom deposits in the Baltic should be undertaken by the participating countries.

REPORT

of

ADMINISTRATION 1923—1924.

I. General.

Composition of the International Council for the Exploration of the Sea.

During the year 1923—24 Spain, Esthonia and Latvia have joined the Council on conditions as reported on p. 10 of the Procès-Verbaux for the meeting of the Council 1923.

Composition of the Bureau.

The members of the Bureau were the same as the preceding year: Mr. H. G. Maurice, President, Professor Otto Pettersson, Professor Johan Hjort, M. Théodore Tissier and the General Secretary C. F. Drechsel.

Committees.

Besides the ordinary Committees (viz. the Finance, the Statistical and the Editorial Committee) the Herring Committee, the Plaice Committee, the Atlantic Slope Committee and the North Atlantic Committee have worked during the year.

Audit of Accounts.

The Accounts of the Council for 1922—23 have been revised and found correct by the Finance Committee, and are to be submitted to the Council for its approval at its meeting in 1924.

A Statement is given below of the Accounts for 1923—24, which shall be revised by the Finance Committee.

Statement of Accounts for the financial year 1923—24.

Receipts:

			Estimates	Real Receipts
I.	1.	Balance brought forward from 1922/23..	123 656.49	123 656.49
II.	2—9.	Annual contributions of the Governments for 1923/24.....	100 000.00	107 484.21
III.		Interest.....	0.00	3 695.59
IV.	11.	Sales of publications.....	0.00	441.37
		Total Kr....	223 656.49	235 277.66[1])

Expenditures:

			Estimates	Real Expenditures
I.	1—6.	Incidental expenses.....	25 600.00	25 600.00
II.	7—11.	Assistance.....	27 250.00	22 627.72
III.	12.	Expenses of the office in Copenhagen	14 000.00	13 285.86
IV.	13.	Travelling expenses.....	7 000.00	5 033.31
V.	14.	Special Resolutions of the Council.....	11 150.00	9 000.00
VI.	15.	Printing and distribution.....	20 000.00	19 219.55
VII.	16.	Extraordinary expenses.....	6 155.55	6 030.77
		Total Kr....	111 155.55	100 797.21

Receipts for the financial year 1923—24..... Kr. 235 277.66[1])
Expenditures — — — — ..... - 100 797.21
Cash balance to carry forward to 1924—25 ..... **Kr. 134 480.45**

[1]) + Russia's contribution for 1914/15, **Rbl. 14 430.54,** deposited in a Leningrad bank.

Meetings.

Meetings of the Bureau have been held in Paris October 1923 and in London April 1924. Present were, in Paris: Mr. MAURICE, President, Professor PETTERSSON, Président TISSIER and Captain DRECHSEL. In London: Mr. MAURICE, President, Professor HJORT, Président TISSIER and Captain DRECHSEL.

From the Committees no report has been received.

II. Work of the Bureau at Copenhagen.

Besides administrative work, correspondance, etc., the following work has been carried out:

A. Publications.

Report regarding the publications issued and cost of same during the financial year 1923—24.

VI. — 15. Printing.

Rapp. & Procès-Verbaux Vol. XXXI	— 600 copies	Kr.	2 229.35
— — — XXXII	— 600 copies	-	1 832.05
— — — XXXIII	— 600 copies	-	1 212.75
Hydrographical Bulletin, for 1920—21—22	500 copies	-	5 097.00
Statistical Bulletin, Vol. XI	— 800 copies	-	4 931.56
Occasional Papers:			
Publ. de Circonstance Nr. 82, by K. L. Gad-Andresen, 600 cop.		-	392.00
— - — - 83, by Anton Fr. Bruun, 600 cop..		-	242.00
— - — - 84, by C. H. Ostenfeld & P. Jespersen, 700 cop.		-	247.00
Circular (Pettersson & Drechsel).....		-	150.00
Distribution of Publications.....		-	1 692,39
Unforeseen expenses: Proof-readings, drawings, translations &&..		-	1 193.45
		Kr.	19 219.55
	Balance...	-	780.45
		Kr.	20 000.00

B. Other Work of the Bureau.

Report of work carried out by the Departments of the Bureau during 1923—24.

a. Hydrographical Department.

The Department arranged for the printing of Rapport Atlantique 1922 (hydrographical part) and collected the material for the hydrographical Bulletin for 1920, 1921, 1922 and 1923. This material has been compiled and made ready for printing.

The Department has acted as an adviser on scientific and technical problems raised by oceanographers in various countries.

b. Statistical Department.

The Bulletin Statistique for the year 1919 and 1920 has been compiled and printed. In June it was distributed to the various countries participating and others.

The work with the next edition of the Bulletin for the years 1921 and 1922 has been carried on, but owing to lack of material from some countries it has not been finished as yet.

c. Plankton Department.

According to the programme of the Plankton section (see Procès-Verbaux XXXII p. 22) the Department has worked out a description of standard nets. This description, illustrated by drawings, has been printed as a Publication de Circonstance and distributed.

The Department has, as usual, acted as an adviser in Plankton questions.

III. Work of the Participating Countries in accordance with the Programme of the Council.

A. General observations.

Belgium. Le manque d'un laboratoire maritime constitue un grand obstacle au travail continu nécessaire aux recherches concernant les pêcheries et la biologie en général. Or, les difficultés de la situation financière résultant du non-paiement des réparations de guerre, obligent le Gouvernement et les autres organismes intéressés à réduire toutes les dépenses et à suspendre même l'organisation des moyens de travail scientifique. Le laboratoire d'Ostende, dont il n'existe qu'un rudiment, loin de se développer, a vu ses installations encore réduites.

Denmark. Denmark has, on two cruises with the "Dana", one in the Skagerak and the Baltic and one at Iceland and the Faroe Islands, carried out investigations in accordance with the Council's resolution.

The hydrographical work undertaken by Denmark has been accomplished. Sorting of material from the cruises has been made.

Finland. Cruises have been made in Finnish waters with the steamer "Nautilus" and motorboat "Aurelia". The observations on temperature, salinity, oxygen, sea-level, currents and ice-conditions at the coastal stations and from lightships have been continued. Special investigations in lakes and rivers have been carried out.

Great Britain. England. During the year under review the Research Vessel "George Bligh" was in continuous commission with the exception of about a month in winter, and carried out 22 cruises. A special visit was made to Boulogne in September 1923 in connection with the "Semaine du Poisson".

In addition to those mentioned in the sectional reports the following scientific publications were issued:—

E. S. Russell: Report on Seasonal Variation in the Chemical Composition of Oysters. Fishery Investigations, Series II, Vol. VI, No. 1, 1923.

J. H. Orton: An Account of Investigations into the cause or causes of the unusual Mortality among Oysters in English Oyster Beds during 1920 and 1921. Fishery Investigations, Series II, Vol. VI, No. 3, 1924.

Scotland. During the year new laboratory accommodation for the staff was provided and fitted up for research purposes. The arrangement whereby the staff was housed in separate buildings over two miles distant from each other was very unsatisfactory. The new laboratory, distant only half a mile from the Bay of Nigg, is a commodious one-storied building providing ample accommodation and permitting of the development of library and museum facilities.

The Research Vessel "Explorer" was practically in continuous commission during the period under review, with the exception of the latter part of December 1923 and the month of January 1924. Each cruise of the Research Vessel extended over a period of approximately five weeks. Whilst the researches undertaken were carried out in accordance with the resolutions adopted by the International Council last year, the work was concentrated on three major subjects, viz. the herring, the haddock and the general physical conditions in the northern North Sea throughout the year. The following cruises were completed:—

1) September—October, 1923. Trawling experiments.
2) November—December, 1923. a) Hydrographical observations on the line Firth of Forth to Fisher Bank and from Fisher Bank to Aberdeen. b) Distribution of 1923 haddock brood. c) Net experiments.
3) February—March, 1924. a) Survey of spring spawning grounds of herring to the N.W. of Scotland and west of Shetland. b) Survey of haddock spawning grounds.
4) April, 1924. a) Marking of haddock. b) Age determination of haddock on various spawning grounds. c) Hydrographical sections in co-operation with the "George Bligh".
5) May—June, 1924. a) Hydrographical survey of Faroe-Shetland Channel in co-operation with the Danish Research Vessel "Dana". b) Trawling observations at Faroe and on Faroe Bank. c) Survey of grounds on north and north-west of Scotland, with particular reference to the spawning areas of the spring spawning herrings.
6) June, 1924. a) An examination of the hydrographical and planktonic conditions on the herring fishing grounds of the Scottish East Coast. b) Drift-net Experiments.
7) July—August, 1924. a) The hydrographical and planktonic conditions on the Scottish autumn herring fishing grounds. b) Trawling observations with a view of the 1924 and 1923 haddock broods. c) Co-operative hydrographical work to the east and west of Shetland with the "Armauer Hansen". Unfavourable weather conditions prevented the completion of the programme.

The motorboat "Enid" was engaged on drift-net experiments and marking of line-caught haddocks during the autumn of 1923.

Ireland. In Ireland, the work undertaken has been carried out.

Holland. From the beginning of the present year the task of carrying on investigations on sea fisheries has been entrusted to Dr. Tesch of the Rijksinstituut voor biologisch Visscherijonderzoek. Dr. Tesch has reported as follows: Unfortunately the very limited means at my disposal — absolutely precluding for the present the use of a suitable research vessel at sea — allowed only work of a rather incidental character. I cannot be held responsible as to the carrying out of various items of the programme adopted by Holland at the meetings of the International Council of 1921—23. Yet I shall try to afford a short review of the work done by Holland since the last meeting at Paris, October 1923.

In the first place I have been occupied with the examination of the material collected during the voyage of the Dutch mission-vessel "De Hoop" to Lerwick in June—July 1923. Various hauls with a large plankton net and with a Petersen young-fish trawl have been made in order to procure some data as to the distribution of plankton on the Shetland herring grounds, W. of Bressay Shoal. I succeeded in drawing up some approximately quantitative tables of larger plankton organisms (chiefly species of Copepoda) for the said area. I investigated some 25 stomachs of herring caught on the very spot, and counted the vertebrae in a small herring sample.

The months January to March of this year have been devoted to study of the composition of the small stuff, landed mostly by small fishing craft at Ymuiden. The various components of each sample (mostly consisting of small plaice and dabs) have been counted, measured and weighed. I also investigated about 200 herrings caught off the Dutch coast in February—March (sex and maturity); age of 50 specimens was determined by the usual scale method.

The rest of the current year has been used for constructing and reparing nets and other requisites to be used during shorter or longer cruises in the inland sea (Zuidersea and Waddensea) which cruises were started in the beginning of July and are still continuing.

Among other work the following may be mentioned:

I. Statistical: The tabulation of all landings of the Dutch steam-trawlers at Ymuiden according to fishing grounds (A 2, B 3, C 2 etc.), as mentioned in Rapp. & Proc.-Verb. 1923, p. 45, has been regularly continued. It proved, however, a serious and hitherto insurmountable obstacle that only in a small percentage of the landings (sometimes only 25 per cent., even 10 per cent. or less in each month) could the origin of the catch be traced with sufficient accuracy. We now possess monthly statistical data of the Dutch landings from the various fishing grounds up to April 1924. Owing to the limited number of landings at our disposal, it has been utterly impossible to tabulate these according to squares (of 10 long. and 30′ lat.).

II. Oil on the waters: I have been occupied myself with some experimental research regarding the influence of floating oil at sea on the plankton living there. For this purpose I remained during the whole of June 1924 at the Zoological station at Helder. Without entering into details I venture to say that all my experiments showed no appreciable effect of floating oil on the minute organisms. A short report on the work shall be forwarded by me to Dr. REDEKE.

Two lightships ("Schouwenbank" and "Maas") and two pilot vessels cruising near Hook of Holland have been fitted out since July of this year with material for collecting plankton samples whenever large patches of floating oil are observed. Such samples will be sent in not later than the end of October 1924.

Latvia. The Latvian work of the Exploration of the Sea was begun in autumn 1923. In July 1924 a cruise with the steamship "Hydrograph" was undertaken covering 38 stations in the Gulf of Riga and in the Baltic.

In addition to the hydrographical work, planktonological observations were made at all the places mentioned.

In 1923 observations on flounders and sprats were made.

Norway.

Works at sea.

1) In July 1923 a cruise was made with m/s "Johan Hjort" to investigate the hydrografic-biological conditions of the fiords and coast waters of the Northern Norway. The cruise commenced in June with a section out from Røst and back to Tromsø. Afterwards the sea north and east of Finmark was investigated and then the larger fiords south to Ranen.

From there the ship went to Aalesund and in collaboration with m/s "Armauer Hansen", belonging to the Geophysical Institute, Bergen, series of current measurements were made in deep water from the bank north of Aalesund along the slope against the Norwegian Sea westward to Muckle Flugga, Shetland. The cruise was completed by a large hydrographical section in the southern part of the Norwegian Sea and the North Sea and back again to Bergen.

In September a cruise was made with the same ship in the fiords south of Bergen to investigate the hydrographic-biological conditions of the water, mostly in relation to the sprat fishery. In November a cruise was made in the same region with a ship placed at the disposal of the investigations by the Norwegian Conserve Factories Association.

In 1924 a hydrographic-biological cruise was made with "Johan Hjort" in the Lofoten waters from the first days of February to the middle of April. 5 times during this cruise the West Fiord region was covered by a net of sections with 25 to 30 stations. A thorough dynamical study of the water circulation of the region has thus been made possible. At the same time the boundaries of the codfish spawning places and the development of the plancton animals, especially those of interest as food for the cod fry, were studied as on the pre-

ceding cruises. During the month of May the ship was used for a hydrographical reconnaissance from Bergen to Orcney Islands — Cape Wrath — Faroe Bank — the region north of Faroe-Shetland with 4 radiating sections north of Shetland and back to Bergen. At the same time "Dana" (Denmark) and "Explorer" (Scotland) filled out the central parts of the same region with a regular system of sections.

From the middle of July this work was continued with the m/s "Johan Hjort" in close collaboration with the current measurement made from the m/s "Armauer Hansen" in the same waters. Both ships completed the vork the 17th of August. There is thus procured an unique material of close, extensive and frequently repeated hydrographic sections and current measurements with new and effective instruments in the shallow as well as in the deep parts of the boundary regions between the Atlantic, the North Sea and the Norwegian Sea. This material is expected to procure unto now not attained insight into the water circulation of the region investigated as well as in the dynamic of the sea in general.

2) With the m/s "Blaafjeld", a small ship used for fishing in the Arctic Sea, and hired for the occasion, a combined hydrographic-biological and fishery investigation cruise was made in June-September 1923 in the waters of Spitsbergen and east to Franz-Josephs Land. In the latter region soundings were taken in waters where before no or very few soundings had been made. Of the hydrographical results might be mentioned that two of the sections between Spitsbergen and Franz-Josephs Land seem to indicate a current of relatively spoken warm water running southward in an intermediate depth east of the Spitsbergen Islands. This work in the Arctic Sea is continued this year in another ship of the same kind, the m/s "Tovik". The expedition started in the middle of June and will be back in the first days of September.
3) With the small m/s "Ossian Sars" belonging to State Hatchery at Flødevig near Arendal two hydrographical sections were taken during the months March-April out from Arendal towards the coast of Jutland. The cruise is to be the commencement of a regular study of the Skagerak waters.
4) In the latter part of June 1924 the Norwegian Fisheries Research s/s "Michael Sars" under the leadership of Dr. Johan Hjort and the collaboration of the Fisheries Bureau started for a cruise in the southwestern part of the Norwegian Sea and Strait Davis to study the hydrographical and biological conditions especially concerning the whales and the herring.

Sweden. As regards the Swedish Hydrographic-biological Commission, all points on the programme adopted at last Council Meeting have been subjected to investigation during the past working year. Here however, only those works are noted which have been completed up to date, so that the reports could be published or sent to press. Reports of work not yet completed will be submitted later according as the results are ready for printing.

I. The principal field of investigation has been the Baltic, and the results of 10 years' research in the Southern Baltic, the waters round Gothland and in the Åland Sea have now been sent to press. These results comprise:
   A. Hydrographical conditions, as regards salinity, temperature, gas content, ionisation and alkalinity of the water at all levels.
   B. Direction and force of current at the bottom of Bornholm Sound and in the Åland Sea.
   C. Area of distribution of turbot, plaice, dab and flounder in the southern, western and northern Baltic.
   D. Occurrence and propagation of cod in the Baltic and the Botten Sea. (Works already printed.)

II. A. In the Kattegat and Skagerak, the investigations on the distribution and growth of the witch have been completed.
   B. Further, the growth of the plaice in the inner fjords until maturity, as also its emigration, on maturity, to the Skagerak and the North Sea, have been studied by marking experiments.

Finally, there are the investigations dealing with the annual and secular periods of the herring fishery, by hydrographical observations of the movements of the under current under the influence of the parallactic tides. These researches have been in progress since 1893, and have now been brought to a conclusion, so that the final results can be laid before the Council at this present meeting.

B. Investigations.

a. Hydrographical Work.

(For programme see Procès Verbaux Vol. XXVIII p. 28).

Belgium. Observations continuées des variations de la salinité et de la température au West Hinder. Les recherches préliminaires sur les variations de la quantité d'oxygène dans les eaux du fond ont établi qu'un laboratoire à la côte est nécessaire pour des observations continuées, ces installations manquant encore, le travail a dû être suspendu.

Les recherches sur les mouvements des eaux de surface ont continué. Un mémoire sur la Dérive dans la Mer du Nord a été publié.

La machine à sonder pour faibles profondeurs est encore à l'essai et sera bientôt décrite.

Denmark. According to the programme undertaken (see Procès Verb. 1922 p. 30 item 9) measurements have been carried out off Christiansoe every fortnight from $^{11}/_{1}$—$^{19}/_{6}$ 1924. For each serial measurement observations have been made of the temperature, salinity and quantity of oxygen in the depths of 0, 20, 40, 60, 80 and 93 metres. At the same time Plankton and fish eggs have been collected.

It was not intended that this work should be continued. The results of it will be published in the Bulletin Hydrographique.

Current measurements have been continued at Horns Reef lightship as hitherto with measurements every 4th hour at depths of $2^1/_2$, 5, 10, 15, 20 and 25 metres.

The usual surface observations have been carried out.

Observations from lightships and coast stations (see Procès Verbaux 1922 p. 42) have been undertaken by the Meteorological Institution and are published in Nautical Meteorological year-book.

Hydrographical investigations have been carried out off Iceland and the Faroe Isles on board the "Dana".

Finland. 1920 March. Res. 2. The surface observations were continued only on the line Helsingfors—Copenhagen.

1920 March. Res. 12. 10 tidal gauges are working, four in construction.

Great Britain. England. The following work has been carried out according to the Resolutions of the Hydrographical Section (cf. Rap. et Procès Verb., Vol. XXXII, pp. 22—24). This programme, which was carried on from 1922 to 1923, is still being followed.

The material called for by Resolutions 3 and 4 has been submitted to the Central Bureau.

Surface temperature and salinity observations have been made at the lightships Smith's Knoll, Varne and Seven Stones. In the case of the first two lightships, arrangements are being made for the sampling to be done every 4th day, instead of every day. Observations on the following commercial routes are being made:—

North Sea	Tyne—Naze of Norway
	Hull—Skagerak[1])
English Channel	Newhaven—Dieppe
	Southampton—le Havre
	Southampton—St. Malo
Irish Sea.....	Fishguard—Rosslare
	Holyhead—Dublin
	Liverpool—Isle of Man[2])
North Atlantic	English Channel—Brazil
	English Channel—West Indies.

Arrangements are being made to test under sea conditions the working of the new Densimeter designed by the National Physical Laboratory.

Sub-surface observations have been made on the customary hydrographical

[1]) This is the new additional route in the North Sea.

[2]) Sampling on this route is erratic. No samples have been received during the present year.

line, Tyne—Lindenaes, from the Research Vessel "George Bligh", in the spring and autumn of the year.

The current measurements carried out by means of Jacobsen's current meter on the Smith's Knoll and Varne lightships have been continued. The worked up observations for the period January 1922—January 1924 have been transmitted to the Bureau. In accordance with an agreement made at the Paris meeting of the Council, England does not undertake the working up of the readings obtained after January 1924; readings subsequent to this date will be sent in the raw state.

A current meter invented by Mr. WOLLASTON is at present undergoing working tests and calibration.

Scotland. On all the cruises of the Research Vessel provision was made for the collection of hydrographical data as part of the regular routine. The salinity determinations were carried out by the Government Chemist.

The following special hydrographical sections were examined:—

1. November, 1923. From the Firth of Forth to the Fisher Bank and from the Fisher Bank to Aberdeen.
2. April, 1924. Hydrographical sections in co-operation with the "George Bligh" extending the observations in two parallel sections to the North Sea.
3. May, 1924. Hydrographical survey of the Faroe-Shetland Channel in co-operation with the Danish Research Vessel "Dana".
4. June and July, 1924. Hydrographical investigation of the Scottish herring fishing grounds.
5. August, 1924. Hydrographical investigations of the areas to the east and west of Shetland in co-operation with the Norwegian Research Vessel "Armauer Hansen".

The following material was submitted for publication in the Bulletin hydrographique:—

1) Temperature and salinity records for the years 1919 to 1923.
2) Determinations of oxygen content at stations during 1923.
3) Monthly means of surface temperatures at Scottish Lighthouses during 1923.

Daily temperature observations were obtained throughout the year from the North Carr Lightship, the Abertay Lightship and from the lighthouses at Rattray Head, Fair Isle, Out Skerries, North Ronaldshay, Stroma, Monach and Ailsa Craig. Temperature observations were also made in the Firth of Clyde area by the Fishery Cruiser "Vigilant".

Irish Free State. Hydrographic observations in accordance with the Atlantic Slope programme have been resumed as noted above. An arrangement has been made whereby the salinity of sea water samples is being determined by the staff of the State Chemist of the Irish Free State, who has been placed in direct touch with the Bureau Hydrographique at Copenhagen. Daily observations of surface temperature at Coningbeg Lightship off the South coast of Ireland are about to be resumed.

Holland. The collection of water samples and observations of temperature in the North Sea have been continued.

Latvia. Hydrographical observations of the surface in the Gulf of Riga and in the Baltic, on the coasts of Latvia, as to temperature, salinity, alkalinity etc. are systematically carried out from passenger steamers, in 15 fixed places.

The observations of depth are made periodically from 5 coastal observation points.

b. Plankton Work.

(For programme see Procès-Verbaux Vol. XXXII p. 42).

Belgium. Continuation des recherches tendant à déterminer les variations qualitatives et quantitatives du plancton dans la Mer Flamande.

Pêches planctoniques hebdomadaires au bateau-phare du West Hinder avec le filet de NANSEN. Pêches planctoniques avec divers engins à bord du steamer "Oithona" dans la région côtière et du garde-pêche "Zinnia" dans le Sud de la Mer du Nord. Expérimentation d'un filet recueillant les formes planctoniques tout près du fond avec les espèces semi-benthiques.

Denmark. The new horizontal closing net has been altered in co-operation with the "Laboratoire hydrographique" and after some experimental work has been proved to be usable.

The extensive studies on the food of the herring have been continued with material from different parts of the Danish waters.

Further collections of plankton off the east coast of Bornholm have been made.

The examination of plankton collections from Ringkøbing Fjord has begun, but is not yet finished.

Finland. The investigations of the littoral vegetation and of the influence of harbour pollution on plankton are in progress.

France. Rien à signaler: l'étude du plankton des croisières françaises est en cours. De plus un important mémoire sur le Plankton de la Mer du Nord (bateau phare de Sandettie) a été remis à l'éditeur du Comité du Plankton.

Great Britain. England.

Rec. 1921. Para. 1. Plankton samples are still collected as in previous years with HENSEN, NANSEN and APSTEIN nets, in the absence of specifications for the new standard net.

Para. 5. All samples are estimated numerically, but during the coming year a new method for the rapid enumeration of the species in a sample will be tested.

Para. 7. The type collection now consists of 145 species. There are no duplicates yet owing to the time required to collect sufficient for exchange, but samples containing unusual species are generally retained and a search could be made for particular species required.

Rec. 1923. Para. 2. A description of Mr. HARDY's Torpedo Plankton Indicator is in course of preparation.

Para. 3. a) Another special cruise was made during November 1923 to

chart the occurrence of the diatom *Rhizosolenia styliformis*. A report on this will probably be ready during the year.

b) A report on the plankton survey of a herring fishing ground (see report 1923, p. 43) will also shortly be completed for publication.

c) Food of the Oyster. A quantitative examination has been made of the stomach contents of 173 oysters, collected at regular intervals throughout a complete year, and 43 plankton-net samples from the bottom waters of the oyster beds have also been examined. A report on this work is almost ready for publication.

Para. 4. Food of the Herring. Over 2000 young herrings and nearly 12,000 adult herrings have been examined for their stomach contents. The following report dealing with the investigation is in the press:—

A. C. Hardy: The Herring in Relation to its Animate Environment. Part. I. The Food and Feeding Habits of the Herring with special reference to the East Coast of England. Fishery Investigations, Series II, Vol. VII, No. 3, 1924.

Work during 1924. A quarterly survey of the plankton is being carried out within the rectangle

53°30′ N. × 1°30′ W.
56°30′ N. × 0°30′ E.
53°30′ N. × 5°30′ E.
51°30′ N. × 3°30′ E.

Scotland. During the periodic cruises of the Research Steamer plankton collections were made to ascertain the conditions prevailing on the fishing grounds. In addition, the general conditions prevailing in the northern North Sea were determined from observations made along numerous hydrographical sections. The areas investigated are indicated in the description of the periodic cruises (see under Hydrographical Investigations). Most intensive plankton observations were carried out on the herring fishing grounds and on the spawning grounds of the herring and haddock. On the special hydrographic cruises collections by the GRAN method were made at fixed stations. Samples were also taken for the determination of the oxygen content of the water by the WINKLER method.

A general report on the plankton conditions in the Northern North Sea is being prepared from the material collected in former years.

In order to make it possible to deal with a large number of plankton collections, the first examination of the samples is confined to the most commonly occurring organisms. The samples are examined in detail later as time permits.

Weekly samples were taken from the pond at the Bay of Nigg.

Irish Free State. It is proposed to adopt the standard vertical plankton net as soon as the NANSEN nets at present in use require to be replaced.

A preliminary list of plankton types (Copepoda) available for distribution or loan has been prepared.

Holland. The work on the brackish water plankton of Holland was continued. A report by Miss G. de Lint, on the value of Copepoda and Cladocera of Dutch inland waters as food of fish will be published shortly.

Sweden. In conjunction with hydrographical observations, investigations were also made in the Kattegat and Skagerak as to the vertical movements of certain crustaceans, in order to ascertain the influence of the same on the vertical migrations of the herring. Plankton investigations were also made in connection with biological work in various parts of the Baltic.

c. Statistics.

(For programme see Procès Verbaux Vol. XXXII p. 26).

Belgium. Des feuilles de pêche du type anglais sont remplies par les patrons des chalutiers à vapeur. Les mêmes feuilles seront bientôt fournies par un certain nombre de pêcheurs à la voile.

Le service de la statistique du marché d'Ostende fonctionne et les données sont communiquées au Bureau central.

Denmark. The general statistics are collected and published for each of the principal waters round Denmark, viz. the North Sea, Skagerak, Kattegat, Belt Sea, Sound, Western Baltic and true Baltic. For the large fishing places a monthly specification of the catch is published, and a great material is collected upon which more detailed statistics can be worked out.

France. Une carte de la délimitation des fonds de pêche a été éditée par l'Office des Pêches de France. A partir de l'année prochaine seront publiés des documents en rapport avec les régions de cette carte.

Great Britain. England. In consultation with France and Scotland a scheme for delimiting the fishing regions has been drawn up and submitted to the other members of the statistical Sub-Committee. It will be laid before the Committee for approval.

The method of tabulation by geometrical areas has proved to be highly satisfactory both in application and in results. Practically all landings of pelagic fish, and also the catches of small vessels of all kinds, can be allocated to single rectangles. Working on the assumption that if 70 per cent. or more of the catch in each trip by a first class bottom fishing vessel was obtained from one rectangle, the whole landing might be so treated, it was found that well over 80 per cent. of these voyages could be allocated to single rectangles. The tabulation of the returns shows that migrations and seasonal variations in abundance are clearly, definitely and consistently shown. No detailed statistics for other countries have been received for tabulation, but arrangements are being made by Belgium for this purpose. The presentation of the combined English and Scottish statistics of the North Sea has been extended to include Hake taken in other regions.

Scotland. In accordance with the resolution of the Statistical Section the use of squared charts for the purpose of showing fishery results was continued.

At a meeting of the Statistical Sub-Committee held in London in January 1924 the boundaries of each Fishing Region were discussed, and proposals in regard thereto were agreed upon for submission to the Statistical Committee.

Irish Free State. Statistics of the quantity and value of fish landed at Irish ports have been sent regularly to the Bureau. As the fisheries concerned are mainly coastal it has not been found practical to refer the catches to squared areas.

Latvia. Collection of detailed statistical materials with regard to the fishery is carried on.

Sweden. General statistics as to the catch in the various areas of the sea round Sweden have been collected. In some cases, material was also procured showing the size of the catch per day and cutter at different times.

d. Herring.

(For programme see Procès Verbaux Vol. XXVII p. 28 and Vol. XXVIII p. 24).

Belgium. Statistique des débarquements de hareng à Ostende, nationalité d'origine. Recherche sur les jeunes Clupéides. Filet de Petersen. Communication des matériaux au laboratoire de Lowestoft.

Denmark. The following points have been dealt with:

a) Location of spawning places.
b) Investigation as to the temperature and salinity on the spawning places.
c) Investigation of the distribution and frequency of the larval stages of autumn and spring spawning herrings in the North Sea, Skagerak and Kattegat.
d) Investigations as to the racial characters of the herrings spawning in different localities.
e) Investigations as to the rate of growth of the herring.
f) Investigations as to the food of the herring.

A paper has been published by Dr. A. C. Johansen: "On the Summer- and Autumn-spawning Herrings of the North Sea". Medd. Komm. f. Havunders. Ser. Fiskeri, Bd. VII, No. 5, 1924.

France. Aucune nouvelle donnée sur la limite méridionale du hareng n'a modifié la note de M. Belloc parue en 1922 (Procès Verb. Vol. XXVIII p. 25).

Great Britain. England.

1) Statistics, collected from all the principal ports, have been used to determine the monthly distribution of the Herring in the North Sea.
2) All samples of herring of commercial size were caught with drift nets by regular fishing vessels. Fifty samples from the Southern part of the North Sea have been examined at Lowestoft during the year and at Grimsby in the autumn. 17 samples were measured. A detailed study of the North Shields fishery was

made in the spring of 1924. A report on the age-determination of herring, based upon these samples, is in preparation.

3) The use of comparative fishing gear in the form of mixed drift nets has this year been discontinued. The otter trawl fitted with a cover over the Cod-end was used in the search for 1 and 2 year old fish.

4) Collections of larval and post-larval herrings were made with the Petersen Young Fish Trawl during the three cruises of S.S. "George Bligh" in the following months and regions:—

November..... East of Dogger Bank
January ..... Southern Bight
March ..... German Bight.

Collections with the same apparatus were made in January off Capes Antifer and Griz Nez and off Ostend from the S.S. "Oithona" under the direction of Professor G. Gilson (Belgium). This material was forwarded to Lowestoft to be dealt with and to be worked up in conjunction with the collections from the "George Bligh".

Collections of herrings belonging to age groups I and II were made from S.S. "George Bligh" by means of a commercial otter trawl, (provided with an extra cod-end of shrimp mesh) in the following months and regions:—

March: Tail End of Dogger, Clay Deep, West of Dogger..... 808 fish
May: between Texel and the Leman Ground ..... 413 fish

A report now in the press deals with the distribution of the larval and post-larval stages in the southern North Sea and English Channel on the basis of material collected during the period September 1921 to May 1923 from the research vessels "George Bligh", "Salpa" (Marine Biological Association) and "Oithona" (Belgium).

5) The rate of growth of larval and post-larval herrings is discussed in the report mentioned under paragraph 4). Part II of this report (now in preparation) will treat of the age, origin and growth-rate of the whitebait herrings (post-metamorphosis stages) especially of the Thames Estuary and other English inshore waters. The material of this part of the report will consist for the most part of samples of Thames whitebait, together with collections made with miscellaneous fine-meshed nets during several years, from 1913 to 1922.

6) Further data for the location of spawning places, indicated by the abundance of newly-hatched larvae, will be available when the Petersen Trawl collections from the "George Bligh", mentioned under item 4, are worked up. The data provided by the material collected during the previous two years are embodied in the report mentioned (Part I) in which the main spawning regions in the southern North Sea (South of 56° N) and in the English Channel are indicated.

Additional information as to location of spawning is provided by the examination of the samples referred to under 2.

7) and 8) See report under Plankton Section.

Scotland.

1) The collection of statistics of the herrings landed from each district according to weight, value, methods of fishing and place of capture was continued.
2) The scheme of co-operation with fishermen commenced in 1922 was continued and extended. A number of steam liners which fish for their own bait were supplied with forms. The data for 1923 were collated and a report on the subject is in course of preparation. Unsorted samples ($^1/_4$ cran) caught by drift-nets, seine nets, bag nets and trawls from various areas throughout the year were examined with regard to size, weight, sex, maturity and fattiness.
3) Fishing experiments were carried out with drift-nets of different sizes of mesh. Samples of herring caught by trawl and by drift-net in the same areas were procured and examined.
4) The larval and post-larval herrings collected by means of various apparatus over a period of years were identified and a report is now in course of preparation for early publication.
5) With a view to adopting similar methods and of coming to a common basis of understanding for co-operation in the study of the fundamental problems with regard to herring investigations, a member of the Scottish scientific staff was sent to Christiania for six weeks to study the question under the guidance of Mr. Lea and to make himself acquainted with the technique and practice of scale-reading. A joint report on the co-operative examination of herring samples was prepared. Collections of scales were made from all unsorted samples examined and critical examination of the scale rings is in progress.
6) Only a few samples of herrings were examined for racial characters.
7) The collection of information regarding the occurrence of "spawny haddock" was continued. Special search was made on the spawning grounds ascertained for the newly hatched fry. Herring spawning grounds were also investigated by means of the Petersen Bottom Sampler. Dredging experiments for the spawn carried out on known spawning grounds yielded very disappointing results.
8) Detailed examination of the food contents of larval and post-larval herring was begun.
9) The food contents of the stomachs of older herring were recorded and plankton collections made on the fishing grounds.
10) No herrings were marked. Adult herrings caught by "dandy" line are being kept in tanks at the Laboratory under observation. In the month of August 1923 about 300 small herring caught by seine net at the mouth of the River Dee were successfully transferred to the tanks at the Bay of Nigg, where they

have been kept under observation. Very few deaths have occurred within the year.

11) Hydrographical and biological observations were carried out on the fishing grounds (see under Hydrography).

Irish Free State. Statistics collected in accordance with resolution 1 of 1921 have been put at the disposal of Dr. Lea. Observations on unsorted samples of herring from the North, East and South coasts of Ireland have been made since the last report and the age determined by scale examination, eight samples having been examined by Mr. Storrow and six in Dublin.

The food of all samples examined in Dublin has been determined.

Norway.

Herring investigations during the season 1923—24.

The leader of the Norwegian herring investigation, Mr. Einar Lea, has been ill and had leave of abscence the whole of this season. He has however been able to work up some of his former material and has finished some publications, now in the press, mostly about the method of the investigation.

In his absence no cruises especially regarding herring investigations have been made, the investigations have been restricted to the collection of samples from the catches made by the fishermen. From the fat- and small herring fisheries 27 samples have been collected and from the large- and spring herring fisheries 39 samples in all. The samples have been worked up on age and growth and the result has given a fairly good view of the condition of the Norwegian stock of herring. The year-class 1904 is now almost played out and only traces of the class is found among the large herring this year. It has been replaced by younger year-classes and in the last two years especially by the year-class 1918. A more extensive report of the investigation will be issued when the leader of the investigation is able to take charge of the work.

Sweden. Search trips were made during the winter months with the research vessel "Skagerak" in the Kattegat and Skagerak, for the purpose of locating any occurrence of herring and informing the fishermen. Hydrographical observations were also made at the same time. The investigations as to year classes, etc. of the herring have been continued, and also the investigations as to different races in the Baltic.

Statistics of the herring catch have been collected.

e. Sprat.

Norway.

Sprat investigations during the year 1923 (by Paul Bjerkan).

The sprat investigations have been carried on in 1923 in the districts where the sprat was taken during the season, viz.: from Kristianiafiord north to Trondhjemsfiord. Samples of the catches were collected and measured in order to judge

of the movements and the strength of the stock. 146 samples were collected and of these about 30 were scale samples for the study of age and growth. As may be known the sprat shoals of the Norwegian coast and fiords mostly consist of quite young, virgin animals. During the years 1920—23 this has been the case to such an extent, that we may say that the sprat fishery of Norway has depended on the one year old sprat, viz.: the sprat in its second summer. Such being the case the growth investigation is mostly limited to the study of the growth of the sprat during its first summer. These studies touch the origin of the young fish shoals in Norwegian water and interesting facts have been derived at. Another question is the habitat of the older sprat, the sprat in its third summer. Some of these are found propagating, but the large stock of this older group is for sure yet unripe but is not found in the waters usually fished by the Norwegian sprat fishers. Investigations are carried on to find the solution of this interesting question. To make the said investigations more complete several cruises (mentioned above) have been made during the season in the fiords near Stavanger and in Hardangerfiord in order to study the hydrographical and biological condition during the different phases of the fishery. A report of the investigations will be published in "Aarsberetning vedk. Norges fiskerier" this year.

f. Cod and Haddock.

(For programme see Procès-Verbaux Vol. XXVII p. 32, Vol. XXVIII p. 38 and Vol. XXXII p. 26).

Belgium. En ce moment la Belgique n'est pas pourvue des moyens nécessaires pour conduire activement des recherches sur ces poissons.

Denmark.

a) General statistics have been collected.

b) Observations as to the distribution and frequency of the pelagic eggs of cod have been undertaken in the Kattegat and Belt Sea in the spring of 1924.

c) A few age determinations on large Cod have been carried out.

d) Some observations as to the food of the large Cod have been made.

France. Une note qui sera imprimée dans le rapport atlantique 1923 sous le nom de M. Belloc, fixe les limites méridionales de l'églefin et de la morue.

Great Britain. England. The Cod and Haddock Committee in 1923 reaffirmed its adhesion to the programme of 1921. This programme embodied sixteen items of which seven (1, 2, 3, 9, 10, 12 and 13) have been dealt with as regards Cod in the paper:—

Michael Graham: "The Annual Cycle in the Life of the Mature Cod in the North Sea". Fishery Investigations, Series II, Vol. VI, No. 6, 1923.

The resolution of 1923 asked particularly for investigations bearing on the effect of fishing on the stock. Data bearing on this are to be found in Section 11 of that paper.

The Ministry has also published two papers by members of associated institutions, dealing with items of the cod programme, under a scheme of "directed research":—

Jas Johnstone, A. Scott and W. C. Smith: Report on I. The Irish Sea Cod Fishery. II. The Cod as a Food Fish. III. Parasites and Diseases of the Cod. Fishery Investigations, Series II, Vol. VI, No. 7, 1923.

Alexander Meek: The Development of the Cod (Gadus callarias, L.). Fishery Investigations, Series II, Vol. VII, No. 1, 1924.

The first of these deals *inter alia* particularly with item 16 of the 1921 programme. The following further items of the 1921 programme are being investigated in 1924 by means of monthly voyages of the Research Vessel.

4) Study of the food of larval and post-larval stages in connection with the collection of micro-plankton and nano-plankton.

5) Study of the natural causes of mortality in larval and post-larval stages.

6) Fishing for early bottom stages.

11) Study of methods of age determination.

In addition, marking of codling in tanks has been carried out with the co-operation of the staff of the Cullercoats Laboratory, to determine if possible what is the best kind of mark to use at sea. It is hoped to report on this last matter, and on points 4) and 5) in 1924, and on points 6) and 11) in 1925.

Scotland. In continuation of the previous year's work the trawling cruises of the Research Vessel were directed mainly to the investigation of the haddock.

(The following sections refer to the recommendations of the Cod and Haddock Sub-Committee of the International Council, Procès Verbaux, Vol. XXVII, p. 34, July 1921).

1—5) A report on the distribution of the eggs, larvae and post larvae of the haddock collected over a series of years is being prepared. Additional collections were made during the year to supplement the work of the previous years.

6—7) As indicated in last year's report, 1923 proved to be an exceptionally good survival year for haddock brood in the North Sea. The distribution of the 1923 year class from the time the fry assumed the bottom habitat was determined by means of intensive trawling observations with small-meshed trawls. The results of these observations were incorporated in a general review which is now in the Press — "I. Problems in Haddock Biology. II. Frequency and Distribution of the age classes in 1923". By Mr. Harold Thompson, M.A., B.Sc. (Fisheries Scotland Sci. Invest. 1924 I (June 1924)).

8—9) The extensive and representative statistics obtained from various fishing ports and from the measurements made by English and Scottish Fish Measurers

who accompanied commercial vessels to the various fishing grounds were continued. More detailed measurement statistics were obtained from the Research Steamer and from the Aberdeen Fish Market. Measurement statistics of the haddock fishery on the Danish coast during the year were supplied by Dr. JOHANSEN.

10) The trawling grounds were sampled by means of the Petersen Bottom Sampler to ascertain the distribution and density of the bottom fauna. The stomach contents of haddock and competing species were examined. Detailed study was made of the food of the 1923 brood.

11) The study of the growth rates and seasonal distribution of the various age-groups was extended. Systematic scale age-determinations on material obtained from all possible sources were carried out at the laboratory throughout the year. Every endeavour was made to work up these scale samples as soon as possible after collection in order that close watch might be kept on changes in the age-composition of the stock in the various regions, and the work modified accordingly. For information regarding the distribution of the youngest year classes reliance was placed mainly on the fishing experiments of the Research Steamer.

The examination of many thousands of scale samples from the North Sea demonstrated conclusively that the years 1921 and 1922 were bad survival years for the haddock brood. On the other hand, the year 1920 was a successful one and, in consequence, the predominance of this brood in the market supplies has been marked. The fate of the 1920 brood was closely followed throughout the year.

13) A suitable mark was obtained for the haddock and a large number of specimens caught mainly by line and Danish seine net were marked throughout the year.

Norway.

Investigations of the cod fishes (by OSCAR SUND).

The works mentioned in former reports of extensive measurements of samples, especially of cod from the fishermen's catches, and collection of scale samples of the same, have been continued to the same extent as in former years. Through the age determination and measurements during this and the preceding year might be shown that the years 1915, 1917 and 1919 have relatively rich year-classes of codfish compared to the interjacent years. For the period (1911—1924) in which material has been collected we might thus place the following year-classes as relatively rich: 1904, 1912, 1915, 1917 and 1919. Just the same years are conspicuous by their minimum of precipitation over the western (and northern) mountain districts of Norway.

g. Plaice.

(For programme see Procès Verbaux Vol. XXXII p. 28).

Belgium. Continuation des observations régulières. Pêches hebdomadaires dans la zone côtière. Tabulation. Mémoire en préparation.

Denmark.

a) Investigations as to the density of the young plaice population have been carried out in the Kattegat and Belt Sea in 1924.

b) Age determinations have been undertaken on plaice caught in the Horns Reef area and in the Kattegat and Sound in 1924.

c) A marking experiment with 200 large and medium-sized plaice was undertaken in the Northern Kattegat in November 1923. A provisional record of the experiment is given by Dr. A. C. Johansen in "Dansk Fiskeritidende" No. 9, 1924.

d) An experiment with transplantation of plaice from the Horns Reef Area to the Little Belt in the spring of 1922 has been described by S. Weis Fogh, in "Dansk Fiskeritidende" No. 30, 1924.

The following report dealing with plaice has been completed:
Kirstine Smith: On the Plaice Population in the Horns Reef Area in the Autumn of 1922.—Medd. Komm. for Havundersøgelser, Ser. Fiskeri, Bd. VII, No. 4, 1923.

Great Britain. England. Ichthyometric work in the North Sea has been continued, the measurers being instructed to devote attention primarily to Plaice. 349,717 Plaice were measured during 1923, and in addition measurements were made on the market at the chief East coast ports every month with a view to ascertaining the size composition of Trade categories recognised.

Otoliths were collected in May 1924 along a line of continuous trawling from the Leman ground to the Haaks Light Vessel, over 4,000 being collected and read for age.

A detailed report on the Transplantation experiments of 1920 and 1922 and of post-war plaice marking experiments has been published (see below). In 1924, 1,800 plaice were transplanted from Danish coastal grounds to the Dogger Bank. This experiment was rendered possible by the co-operation of the Admiralty and of the Danish fishery authorities.

Researches on the benthos of the Dogger Bank have been continued and extended to other grounds. In these investigations, which have dealt particularly with species forming the food of plaice and haddock the Petersen Grab has been employed throughout, and quantitative conclusions have been reached. Light has been cast also on the life cycle, mortality and spawning period of the molluscs predominating on the Bank.

The whole consideration of the problems of the Plaice fishery has been carried out in close co-operation with the Statistical Staff of the Ministry.

In place of submitting Mr. Borley's report on the work of 1922 for pu-

blication in the Rapports et Procès Verbaux it was decided to publish a report succeeding "The Plaice Fishery and the War (Fishery Investigations, Series II, Vol. V, No. 3, 1923), which should cover the period from the beginning of January 1921 to the close of 1923.

Publications dealing with the Plaice:—

Davis, F. M.: Quantitative Studies on the Fauna of the Sea bottom. — No. 1. Preliminary Investigation of the Dogger Bank. Fishery Investigations, Series II, Vol. VI, No. 2, 1923.

Carruthers, J. N.: Report on the English post-war Plaice Marking and Transplantation Experiments. Fishery Investigations, Series II, Vol. VI, No. 5, 1924.

Scotland. The marking experiments on small plaice under 25 cms. in the coastal zone of the Scottish East Coast were continued. A report on the results of these marking experiments is now in course of preparation.

A number of plaice caught during the trawling experiments in areas outside the North Sea were marked and liberated.

The returns of marked lemon soles were very poor. Out of a total of 810 marked, only 36 (or 4.4 per cent.) were recovered. Scale samples were taken from all marked fish when liberated.

A report on the marking experiments on lemon soles based on recaptures to the end of 1923 is being prepared and will be published at an early date.

Sweden. Investigations regarding the occurrence of plaice in the fjords of the west coast have been continued, the fish life of these fjords in general being studied at the same time. A report on the occurrence and migrations of plaice, flounder, and dab in the southern Baltic has been drawn up and is ready for publication.

Investigations as to the age and growth of the witch have been continued and it has been found that the otoliths, when cut and polished in a particular way, provide an easy means of determining the age.

h. The Committee of the Atlantic Slope.

(For programme see Procès Verbaux Vol. XXXII p. 26).

Great Britain. England.

1) In accordance with arrangements made at the meeting of the Interdepartmental Committee on Fishery Investigations held in Dublin on April 5th 1921, the International Hydrographic Stations L1 to 6, E1, E2, E3 between Plymouth and Ushant, N1 and N2 between Ushant and the Scilly Isle, N3 and E6 in the Bristol Channel, have been worked periodically by the S.S. "Salpa" of the Marine Biological Association.

All the data obtained are communicated to the International Council

at Copenhagen, L'office Scientifique et Technique des Pêches Maritimes at Paris and to the Ministry of Agriculture and Fisheries at Lowestoft, the salinity of the samples of water being determined by the Government Chemist.

An account of the Hydrographical Features of the water, in the neighbourhood of Plymouth, during the years 1921 and 1922, has been published in the Journal of the Marine Biological Association (Vol. XIII, No. 1, pp. 225—235), while a general review of the whole Atlantic Slope has been undertaken by the French Fisheries Department.

Since July 31st 1923, up to the present time, the Station E1 together with Stations L1 to L6, have been worked every month. Cruises to Ushant and thence to the Bristol Channel were made in November 1923, February, May and July 1924, the Stations being worked as the state of the Sea permitted.

An investigation of the water movements in the English Channel is now being carried out by means of drift bottles by the Ministry of Agriculture and Fisheries conjointly with the Marine Biological Association.

The data obtained every month at E1 since April 1921 are indicating a definite connection between the monthly temperature changes in the sea in this area, which vary from year to year, and monthly meteorological conditions.

Samples brought back to the Laboratory from these cruises have been utilised by Dr. W. R. G. Atkins to determine the variations in soluble phosphate content and hydrogen ion concentration of the waters in this area, by Dr. M. V. Lebour to determine variations in and distribution of plankton fauna, and by Mr. H. W. Harvey in an investigation on the variation in oxidising properties of samples of sea water from different depths throughout the year. The data are also being used by Mr. F. S. Russell in an investigation of the vertical distribution of plankton and young fish.

2) While it has not proved possible to carry out special investigations on oil pollution at sea, experimental data relating to the effect of oil on oysters and other marine invertebrates will be found in the report by Dr. Orton referred to under General Observations.

Irish Free State. The work which has been discontinued since June 1920, owing to the Fishery Cruiser not being available, was resumed in May 1924, when Physical and Plankton observations were made on seven stations along 8° W as far south as 49°20′ N and on two stations to the eastward of this line. A second cruise was made in June 25th—27th when Physical and Plankton observations were made on seventeen stations along the agreed line viz.:— 8° W as far south as 49°20′ N thence to the Scillies and thence to Hook Point, Co. Waterford. During these two cruises Physical and Plankton observations were also made at ten mile intervals across the Irish Sea along 53°20′ N.

France. Le détail des travaux français dans l'Atlantique paraîtra dans le Rapport Atlantique 1923. De plus en Avril 1924 et en Juillet 1924 le navire "Tanche"

se rendant ou revenant de la Méditerranée a fait des observations hydrologiques entre Gibraltar et Lorient et effectué des recherches sur la biologie du thon blanc ou germon (Th. alalonga).

Holland. In accordance with point 4 of the programme of the Atlantic Slope Committee (Rapp. & Procès Verb. XXXII, p. 26) a series of experiments on the effect of petroleum oil on plankton and fish-larvae were conducted by Dr. TESCH and Mr. LIEBERT.

i. Baltic Committee.

(For programme see Procès Verbaux Vol. XXXII p. 29).

Denmark.

a) Collections of fish eggs and larvae have been undertaken in the western Baltic and the true Baltic in connection with hydrographical investigations.

b) Investigations have been made as to the distribution and frequency of bottom-invertebrates in the south-western parts of the true Baltic.

The following reports dealing with investigations in the Baltic have been published:—

Kirstine Smith: Investigations of Plaice from the Western Baltic June 1921—August 1922. — Medd. Komm. for Havunders. Ser. Fiskeri Bd. VII, No. 2, 1923.

P. L. Kramp: Fish Eggs and Larvae collected in the Belt Sea in March 1922. — Ibd. Bd. VII, No. 6, 1924.

Finland. 1923 Oct. point 4. A cruise of 68 stations has been made in June 1924 in the Baltic north of Gotland.

1923 Oct. point 5. The observations have been continued on the same scale as before.

1923 Oct. point 6. Serial observations of oxygen are in progress at Märket.

1923 Oct. point 8. Bottom-samples have been taken during the June-cruise and are under investigation.

Sweden. A detailed work on the occurrence etc. of cod, flounder, dab and turbot in the middle and northern Baltic has been published. Marking experiments have been made with flounders off the coast of Gothland, in order to study the migrations of these fish.

Investigations with cod have been continued according to programme, as also investigations with the Baltic herring.

Investigations have been made as to the occurrence etc. of the sprat on the Swedish coast of the Baltic.

In conjunction with the biological investigations, hydrographical observations have also been made.

Material relating to the bottom fauna has been collected and dealt with.

General statistics regarding the fishery in the Baltic have been collected.

k. Eel investigations.

Sorting and identification of the material af Eel larvae and prelarvae from the "Dana"-Expedition 1921—22 in the Atlantic continued.

Racial investigations with Conger vulgaris and other Conger species.

l. North Atlantic Committee.

(For programme see Procès Verbaux Vol. XXXII p. 26).

Denmark.

1) During April and May 1924, the cruiser "Fylla" of the Danish R.N., has carried out investigations off the south coast of Iceland of the quantity of pelagic cod-eggs in connection with the hydrographic observations on the principal spawning-places of the cod.
2) During June and August 1924, the Danish cruiser "Islands Falk", has carried out hydrographic and biological research in the sea between Iceland and Cape Farewell and off the west coast of Greenland.
3) Investigations from the "Dana" Research Steamer at the Faroe Islands and Iceland:—
   A. The Faroe Channel. Hydrographic observations in the Faroe Channel in May 1924 (about 60 stations).
   B. The Faroe Isles. Hydrographic-biological investigations in the waters surrounding the Faroe Isles with special regard to the pelagic stages of the economically most important species.
   C. Iceland. During two circumnavigations of Iceland in June and July, hydrographic-biological investigations of the occurrence of pelagic larvae of the species dealt with by the Commission (Cod, Haddock, Plaice, Halibut, Herring).

Collection of material for determination of age of these species at selected places in the warm and cold regions of the Sea surrounding Iceland (about 12000 samples of otoliths and scales).

Examination of the food of these species off the various coasts of Iceland.

Trawling experiments at places where intense trawl fishery takes place (Faxe Bugt) in order to elucidate the variation in the stock of fish inside and outside the three mile limit.

Trawling experiments at a place off the north coast only little explored for comparison with the intensely explored regions in the Faxe Bugt.

Marked fish. Off the North coast 100 and off the east coast 300 big Cod (beyond 70 cm length) have been marked. Also off the north coast 225 large plaice (over 35 cm length) have been marked.

Special hydrographical research. At a fixed place in the Faxe Bugt

(64°14′5 north latitude, 22°13′ W long.) serial measurements of temperature and salinity (11 altogether) have been carried on during June and July.

Provision has been made for having these measurements continued all the year round in order to examine the seasonal hydrographic variations in Icelandic waters.

Current measurements were made on 20th—21st June 1924 off the West coast of Iceland (64°16′ N, 23°14′ W on depth 90 m) for 15 hours 45 m with bearings of floating buoys from a place marked with an anchored buoy after J. P. Jacobsen's method.

Examination of the food and maturity of the herring in particular off the North coast in connection with collection of Plankton samples and hydrographic observations.

4) Measurements partly in connection with determination of age of fish, halibut and cod in particular, landed in Reykjavik, Iceland. The Icelandic adviser in fishery matters, cand. mag. Bjarni Sæmundsson, arranged for these measurements.

Great Britain. England. In order to supplement the work of the "Dana" unselected samples of catches were measured on Steam Trawlers working the Iceland and Faroe grounds. The particulars of these observations are as follows:—

Date	Ground	Plaice	Cod	Haddock	Lemon Soles	Ling	Halibut	Whiting
1924								
6th-16th May.	Iceland	2 776	4 504	7 467	399	622	157	62
3rd-10th June	Faroe	—	7 270	6 323	1 220	41	178	—

In addition to work at Sea, market measurements of Halibut were made at Grimsby during the period May 1st to June 17th, which thus covered the sea time of the above voyages. The halibut measured were as follows:—

Market Category,		Large	1216
—	—	Medium	1009
—	—	Small	3996
		Total...	6221

Special statistics relating to the catches of English trawlers in Iceland and Faroe have been communicated to Dr. Schmidt.

Scotland.

a) In February—March 1924 a hydrographic-biological cruise was carried out in the area between the Butt of Lewis and the North of Shetland.

b) In May 1924 a hydrographical survey of the Faroe-Shetland Channel was made in co-operation with the Danish Research Vessel "Dana".
c) In May—June 1924 trawling surveys were made at Faroe, Faroe Bank and on the grounds north and north-west of Scotland.
d) In August—September 1924 hydrographic-biological investigations were made in the areas to the east and west of Shetland.

The hydrographical work was carried out in co-operation with the Norwegian Research Vessel "Armauer Hansen".

Age assessments of haddocks caught at Faroe and Iceland and landed at Aberdeen Fish Market were made by means of numerous scale samples.

France. Le navire de guerre "Ville d'Ys" a effectué printemps 1924 des stations hydrologiques autour de l'Islande; les renseignements fournis par ce navire seront transmis au Comité de l'Atlantique Septentrional, en vue d'être publiés.

Norway. Hydrographical research from the "Johan Hjort" in May 1924 in and round the Faroe Channel.

m. Limnological Section.

(For programme see Procès Verb. XXXII p. 24.)

Denmark.

a) Age determinations have been carried out on the sea trout from various localities.
b) A marking experiment with sea trout has been undertaken in a rivulet on the island of Bornholm.
c) Examination of H-ion concentration in Ringkøbing Fjord and in various lakes and small rivers in the vicinity of this Fjord.

Observations have also been made of the H-ion concentration in various fresh waters of Sjælland (Sealand).

Finland. Investigations of the composition of the year-classes of Coregonus albula in the Keitele and Pyhäjärvi lakes continued, similar and other investigations in the Nilakka and Pielisvesi lakes finished. Salmon investigations in the Ule, Kemi and Kymi rivers continued.

Holland. A report on the life-history of young salmon in Holland has been published in the "Verhandelingen en Rapporten". Also a study on the growth of the Bream (Abramis brama).

Irish Free State. Collections of salmon scales and measurements are being made on certain typical Irish rivers.

The river Ownea in Co. Donegal, which is under the control of the Department of Fisheries, together with a hatchery situated thereon, are being prepared for detailed experimental investigation into the growth and habits of salmon.

Reports on the work carried out at the Limnological Laboratory on Lough Derg in the years 1920—23 are in course of preparation.